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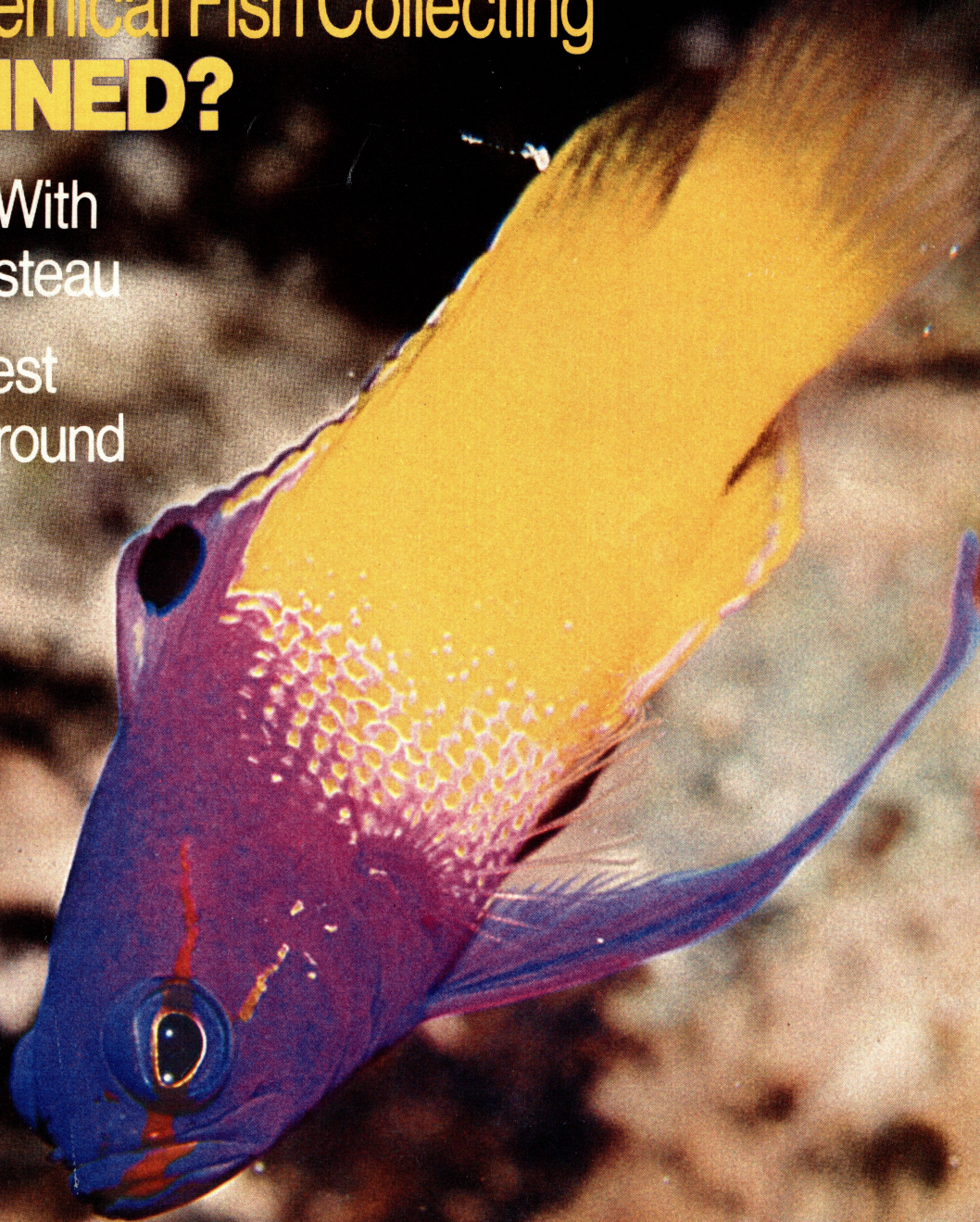


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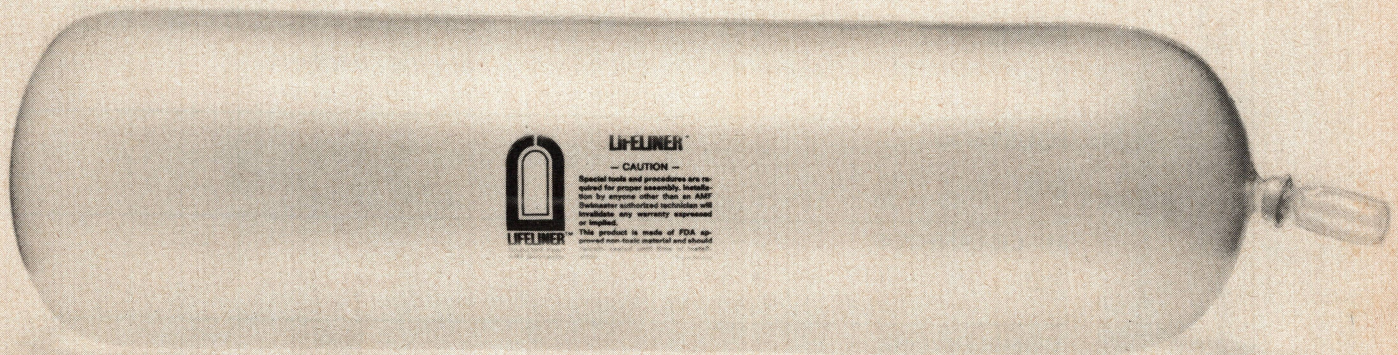
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skin diver

VOLUME TWENTY-THREE NUMBER FOUR



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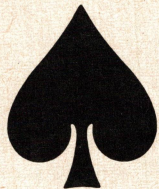
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STAFF | PAUL TZIMOULIS *Publisher* / JACK McKENNEY *Editor* / CONNIE JOHNSON
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Cover—This fairy basslet was photographed in tropical water by Jack McKenney using a Rolleimarin camera with a Subsea strobe, Ektachrome X film at f16, 1/500 sec., in 60 feet of water. The fairy basslet is one of the easier fishes to capture alive with a net, not drugs. For more on fish collecting, see story on page 52.

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A



All major sports — tennis, sports car racing, golf, bowling, etc. — have contests in which participants can earn thousands of dollars in cash prizes. NASDS feels the sport of diving deserves its skill contest also. So here it is

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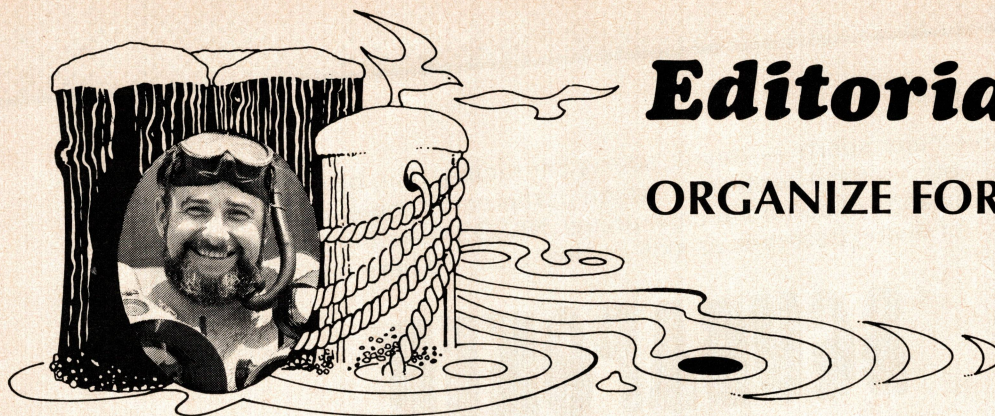
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V



Editorial

ORGANIZE FOR SURVIVAL

By the Publisher

For months now, SKIN DIVER has been patiently listening to spearfishermen's laments. The wave of reader letters has been enormous, far outnumbering response to any other controversial issue we've ever tackled. More importantly, the quality of these responses has been impressive and many strong arguments in favor of spearfishing have been presented . . . in fact, they are so good, we've chosen to publish many of them in this issue.

In rebuttal to the conservationists' attack, devoted spear enthusiasts argue they are equally appreciative of the marine environment, and that they do exercise discretion in their selection of game. They protest as unfair treatment their being branded the villains of diving. They claim unjust discrimination by state fish and game departments, while the line fishermen and commercial fishing interests continue to get away with murder. They also point out the beneficial effects of spearing trash fish in overpopulated lakes and other inland waters, thus performing a noble service for both the game fish and the freshwater environment.

SKIN DIVER must agree that everything these spearfishermen have said is true. Unfortunately, it's only half of the story. These very same staunch defenders-of-the-spear would prefer to turn a deaf ear toward reports of unregulated spearfishing contests where the catch is left rotting on the beach. They don't want to hear about those commercial "buffalo hunters" who still spear a thousand pounds of fish in a day and sell them to Caribbean resort hotels and local island fish markets. They prefer not to think about the Polynesian spearfishermen who hunt at night with scuba and a searchlight, killing parrotfish as they sleep. They won't admit to the blood thirsty spear nut who blows a ten pound grouper to bits with a power-

head mounted on the front of his spearshaft. And they refuse to accept any credit for the ignorant neophyte who stupidly shoots a friendly angel-fish or garibaldi, without the slightest concept of right and wrong. In the minds of many spearfishing enthusiasts these revolting events don't exist; or they represent the so-called "isolated incident" and are crimes not committed by the true spearfishing enthusiast. Like the classic three monkeys, our defenders-of-the-spear would prefer to "see no evil . . . hear no evil . . . speak no evil."

This kind of close-minded thinking will not wash. The spearfishing fraternity must come to grips with the reality of our times. Ignorant and uncontrolled people armed with deadly speargun weapons are violating the natural laws of marine conservation every single day of the year. More than a million spearguns have been sold in the U.S. over the last 20 years, with the majority of these weapons falling into the hands of people unacquainted with local fish and game laws, safe speargun handling, or any knowledge of the delicate balance of our marine environment.

Whether they like it or not, the spearfishing fraternity is being held responsible for these crimes against the sea. So far as the public is concerned, anyone carrying a speargun into the water is automatically a spearfisherman. They do not distinguish between the dedicated sportsman and the spear-clod. As one beachwatcher so aptly put it, "All you guys look alike to me."

With the rapid growth of sport diving has come a proportionate increase in the number of speargun-toting beachniks. Spearguns are being sold by the tens-of-thousands to kids, tourists, weekend meat hunters, and just about anyone who has the money to pay for one. Spearguns are be-

ing sold over the counters of department stores, discount houses, hardware stores, sporting goods stores, marinas, beach supply shops, tackle shops, and a dozen other types of outlet. There is no control, no discretion, and no education. It's no wonder the conservationists have become infuriated with the spearfishermen, for they are a highly visible target for the public's wrath.

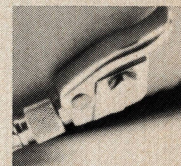
If spearfishing is to survive, the people who genuinely love this sport will have to band together for their own good. They can no longer be content with this sport's present system of representation. The Underwater Society of America and various state diving councils have failed to handle the problems which beset spearfishing. They have concentrated their energies on promotion and administration of competitive spearfishing. Membership has been weak and funding very poor. The very structure and bylaws of the Society have proved self-defeating. In 15 years of operation, the Underwater Society has been unable to remove the stigma of "super killer" which the American public associates with spearfishing . . . and the situation is growing worse.

If spearfishing is to become an honorable, acceptable sport in America, it will have to be better organized. It's time to think big! Spearfishing needs a new, enthusiastic national association . . . with 50,000 to 100,000 supporting members, a paid staff and headquarters, and some really dynamic leadership. It has to be the kind of organization which is 100 per cent committed to dealing with the problems of speargun safety, marine conservation, and educational reform—an organization with clearly defined goals for growth, development of new programs, and feasible methods for voluntary controls. It's been done in scuba diving, why not in spearfishing?

(Continued on Page 7)



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EDITORIAL

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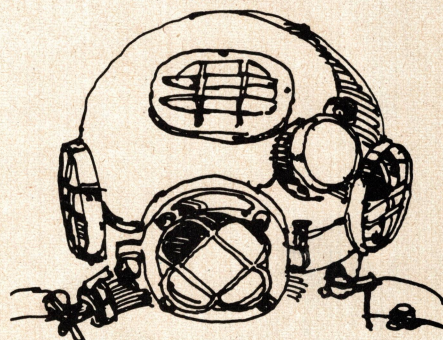
More importantly, we need a strong spirited organization with the capability of raising \$500,000 to \$1,000,000 funding. There's much work to be done and it's going to cost a lot of money. We need nationwide instruction courses in safe speargun handling, fish and game laws, fish identification, and conservation practices. We need to develop spearfishing sanctuaries, where the sportsman can hunt in peace and without ridicule. We need research and development of restocking programs for depleted reefs. Great amounts of money will be required for legal assistance in fighting pollution and beachfront closures. A strong lobby must be established to fight off unfair legislation.

Impossible? Not at all . . . one need only look at the track record established by such influential sportsmen groups as the National Rifle Association, Ducks Unlimited, and the Isaac Walton League. The ranks of the NRA have swelled to over 1,500,000 members and they have become a strong political force in preserving their constitutional right to bear arms. The NRA has also developed a very fine national educational program for gun safety. In the past 30 years of its existence, Ducks Unlimited has successfully raised a total of \$20,000,000 for the restoration and preservation of Canadian wetlands, so necessary for the nestling and hatching of North American duck species. To date, they have restored 1,800,000 acres of lakes, ponds and marshlands, significantly increasing the duck population.

Sport diving is too small you say? Not really . . . there are now an estimated 2,000,000 active sport divers in the United States and Canada. An estimated 250,000 new persons will receive scuba training and become certified this year alone. Many of these divers are sympathetic toward spearfishing, even though they may not be involved with dive clubs, competitive spearfishing activities, or other hard core spearfishing activities. Most all divers believe in man's right (actually a privilege) to spear a fish for his own personal food.

A dream perhaps? At this point, it's not even a dream—it's a challenge. Hopefully, some dedicated soul, or group of souls, will step forward from the ranks of the spearfishing fraternity and accept this challenge. That day will be the beginning of a dream . . . a dream which may culminate in a national organization for the survival of spearfishing. Only then can the spearfisherman begin to right some of the wrongs which plague him.

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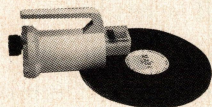


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... Your April editorial regarding buddy breathing missed what I feel is an important point. That is avoiding a buddy breathing situation. Your editorial also sited that running out of air always comes as a surprise. In my opinion a diver has to be in control of his situation underwater and this cannot be possible without knowing your air supply. Experienced divers can guess fairly accurately and new divers can't, neither should try. I feel that an underwater pressure gauge, depth gauge and compass are not accessories, they are a necessary and important part of scuba as is the safety vest. "J" valves are not the answer. Certainly "J" valves are an important safety feature. I'd feel uneasy if my car's gas gauge wasn't there and that goes for an underwater pressure gauge, too. Divers should be taught how to use double hose regulators, also an octopus system could be best for some situations.

TOM McCLUSKY EAGAN, MINN.

... Three cheers for your February 1974 issue. I especially appreciated Bill Barada's "Aquatic Anomalies." Just when is man going to begin to realize that the oceans are dying, and more controls are necessary to curb pollution? I am discouraged and disgusted each time I read an article about coral reefs and harmless marine life dying because of man's exploitations.

I have been diving for less than a year now, but have already come upon some evidence of man's exploiting our wondrous seas. We divers must get everyone to respect the ocean and its now abundant marine life; for if we don't, the results will prove disastrous for all of mankind. SARAH B. EDWARDS

BARNSTABLE, CAPE COD, MASS.

... I am doing research on the relative merits of two hose regulators in contrast to the more recent one hose versions. I am not convinced that the one hose regulator is superior; many of the arguments that have been advanced in favor of it are fallacies and distortions of fact. I would like to communicate with anyone who has an interest in this question. D. E. DODGE

355 REA AVE., HAWTHORNE, N.J.

... My attention has been drawn to the August issue of SKIN DIVER pointing out the article on Akumal written by Bill Barada. It was a very good article and in truth Akumal is a lovely place as I myself have had



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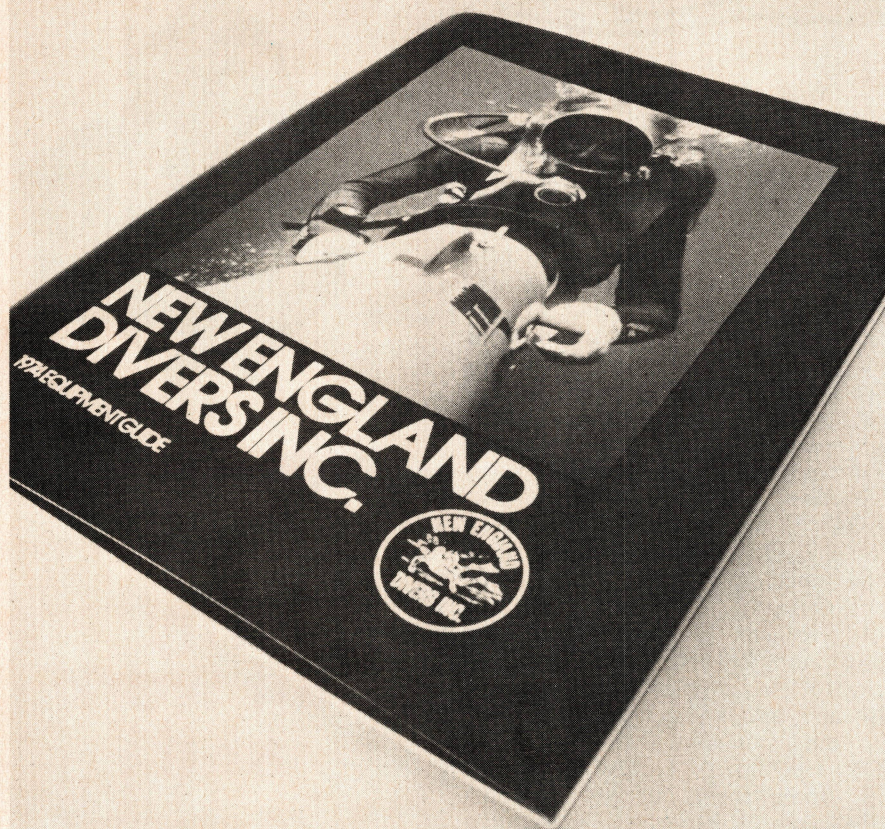
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occasion of visiting it. Nevertheless, I must point out that on the first paragraph of the article the statement that says that Akumal locates the world's second largest barrier reef is not accurate. As far as I know Belize in Central America proudly possesses the world's second largest barrier reef.
L. J. CUELLAR

BELIZE TOURIST ORGANIZATION

... In your article, Diver Offspring: Miss or Myth, December 1973, you show a young diver with tanks and weight belt on without a life vest. In our opinion a life vest is the most important piece of divers equipment. We believe it should be impressed on every diver as such. We think you have a very fine magazine, and we enjoy every issue, but we believe that safety should never be overlooked.

LEON E. MASTERS/CHARLES S. ROOD
APO SAN FRANCISCO

... Two months ago my wife and I made a dive trip to Tortolla, British Virgin Islands. Of four years of diving in the Caribbean area, we felt some of the dive sites around Tortolla were the prettiest and most fascinating we had ever encountered. Additionally, Tortolla has an excellent dive guide.
WILLIAM W. ROSEN

NEW ORLEANS, LA.

... Concerning the article, "The Ice Man Cometh," December '73 SDM, there is a suggestion that after the perimeter of the diving hole is chopped, the block of remaining ice ... "should be forced under the surface of the ice and placed so that a small step about a foot wide protrudes."

I don't feel that this is a very wise thing to do, since there is the possibility of this block slipping back into its hole, sealing divers under the ice. The block should be chopped into pieces and taken out of the water.

BARRY BONTEMPO

PASSAIC, NEW JERSEY

In 10 years of ice diving, and many hundreds of individual ice dives, we have always used our formula for putting a block of ice under the surface with good results. Never have we had any problems with the ice floating back into the hole. The only exception would be diving in a river. In this case, the ice block is placed on the down river side of the hole. The reason the ice is not chopped into little pieces is principally one of concern with the safety of those people

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Catching great pictures is easy with the Nikonos system. In fact, if you aren't taking the Nikonos II with you on your dives, you're missing the greatest part of diving: the ability to take the mystery and beauty of the world beneath the sea home with you. The Nikonos "deep sea fishing system" can provide you with everything you need to capture the essence of this world in superior photographs.

At the heart of the system is the Nikonos II camera. As compact and easy to handle as any fine "35," yet incredibly rugged, it is waterproof to a depth of 160 feet, completely dust-proof, and resists corrosion.

Superior photographs are borne of superior optics. Nikonos lenses are made by Nikon, world famous for optical precision and reliability. The standard 35mm f2.5 is especially popular for most underwater situations. If you want to cover an extra wide field at close range, our 28mm f3.5 will provide it. It is also the first lens designed and corrected for the unique light and distance-distorting


qualities of the sea. If you're going to explore underwater caves or sunken ships, our 15mm f2.8 ultra wide angle Nikkor is for you. This lens, too, is specifically designed for use underwater.

The system also offers an 80mm f4 telephoto for use in situations where you want to keep your distance.

Within any environment, there is a smaller world of intrigue and fascination waiting to be discovered. The Nikonos Closeup Outfit takes you within inches of colorful coral or face to face with a starfish. You can get up to 1/2 life-size reproduction. The Closeup Outfit is made by Nikon with the same precision and durability as all Nikonos system components.

Underwater, darkness follows depth. If your dives take you deep, or if you have an eye for the unknown, hidden

areas of the sea, the Nikonos flash gun is a must. For that matter, using flash is a good idea regardless of where you dive. It livens color and highlights details that you might otherwise miss. It enables you to take daylight with you as deep as you go.

The Nikonos deep sea system also offers action viewfinders, lens hoods, filters and an exposure meter. Each component combines with the others to assure you of vivid, high quality photographs. When you go fishing with Nikonos you'll never come home empty-handed. Look into it at Nikon photo dealers or selected dive shops. Or write for Folio 12, Nikon Inc., Garden City, N.Y. 11530. Subsidiary of Ehrenreich Photo-Optical Industries, Inc.  (In Canada, Anglophoto Ltd., P.Q.)

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Weight	

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- Wrist
- Forearm
- Elbow
- Biceps
- Ankle to Knee
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who share the use of frozen fresh-water lakes and ponds. Even if it was possible that the block could begin to slip back, it would be seen by the safety divers and tenders and could be pushed back . . . Daniel J. Gingras, author *The Ice Man Cometh*.

. . . I have been diving in my area for two years now. I find it very difficult to go diving as often as I would like because I am unable to locate other diving enthusiasts to dive with. Can you offer any suggestions or information as to where I might be able to join a scuba diving club, group, etc. in my area?

RICHARD SMIOUSKAS

BROOKLYN, N.Y.

Check your local dive shop as the best source of diving conditions, clubs, instruction and general diving information. Your local newspapers might also have information on classes for instruction in diving, a good place to meet other divers.

. . . Recently you have been warning scuba divers that come from other states, that cave diving is dangerous in the State of Florida. Open water diving can be dangerous in the State of Florida for the inexperienced.

On Saturday, January 19, it was a beautiful day in the city of Daytona Beach. There was a light and variable wind with the seas one to three feet, when my wife and I, both senior divers, went fishing on the jetties. When we arrived, we noticed three young men suiting up to enter the surf to dive the jetties. The first thing that we both noticed was that they were not wearing wet suits. Although the water is not real cold, it could be unpleasant for any lengthy dive at this time of the year. They did not have buoyancy compensators on except for one gentleman who had twin tanks on. Two of the divers did not even have snorkels.

They entered the surf with the tide coming in and before long, they were pushed up against the jetty and a good wave came along and knocked one of the divers over the top of the jetty. I would imagine the Navy's UDT Team may train this way, but for the average scuba diver, I would imagine it was quite an experience. Before long, I noticed that the diver that had been swept over the jetty was the one that had a buoyancy compensator and he had dropped his tanks, which obviously had considerable air

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ED BRAWLEY'S SEVEN SEAS, 598 Foam St., Monterey
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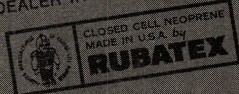
This is the suit we built for Skylab's recovery team. It had to be a no nonsense kind of suit.

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left in them since they had only been in the water for a very few minutes.

The other two divers returned to shore, dropped their tanks and one diver put his flippers back on, left his face mask and without a buoyancy compensator or any other lifesaving device, went racing out into the middle of the inlet to save his friend. Now the current is moving pretty good, and in another ten minutes, the diver would have been pushed up to shore, but here is a diver swimming against the current going out to help somebody that could have drifted in. The third diver, in his haste to get help, spun his car around and got stuck in the sand. In a very few minutes, one of the boats fishing in the inlet, did pick up the two divers and brought them to shore. The one young man that had dropped his tanks was cut up a little bit from the barnacles when he went over the jetties and was in a state of shock. Help did arrive, and the young man was transported to the hospital and I feel certain that he will be all right. However, in their last haste to get their friend to the hospital, they were going to leave their car, which had now been removed from the sand right next to the water, where, within a couple of hours, the tide would have filled the car up with water.

We love for people to come to Florida. It is good place to swim and scuba dive. However, the dive instructors, somehow, must teach current diving and safety in their programs. The whole trip could have ended with possibly one and even two divers losing their life, when if they had taken the proper gear and knew anything about current diving, it should have never happened.

DAVID P. EDWARDS

DAYTONA BEACH, FLA.

... I have just read the article in your December, 1973, issue entitled, "Revolutionary Device Detects Bends Bubbles." I am pleased with your facts about the bends; it is a subject that divers tend to avoid, yet it is a subject that for new divers may be a life or death matter. I was glad to read your article and see that headway is being made. Keep up the good work.

JAMES JAY BLACKETT

STANWOOD, WASH.

ADP AT NMU

George and Betty Tomasi are hosting an advanced diver program at Northern Michigan University again this summer. Based on last year's highly successful program, four weekend courses have been scheduled for 1974: July 20 to 21; July 27 to 28; August 10 to 11; and August 17 to 18. A deposit of \$20 per person will reserve the weekend of your choice.

Each weekend is planned so that all PADI Advanced Diver requirements are accomplished. Dives include a historic artifact dive, a wreck dive, one night dive and one deep dive. The \$66 fee for the weekend includes housing on Friday and Saturday nights in the university dormitory, and breakfast and lunch in the students' diving room on Saturday and Sunday.

For more information or reservations contact: George and Betty Tomasi, NMU Scuba School, Marquette, Michigan 49855. ➤

HICKS WITH SEAMCO

Seamco Sporting Goods recently announced the appointment of Michael L. Hicks as marketing manager for their underwater products. Seamco, a division of Dart Industries located in New Haven, Connecticut, manufactures a wide variety of athletic balls, tennis equipment and the Seamco/Nemrod line of underwater sports equipment.



Hicks went to Seamco from USM Corp. where he served as product manager of their construction products division. A qualified sport diver for many years, he has designed cartridge-actuated fastening guns for underwater construction, as well as underwater camera housings and other devices for sub-sea application. He attended the University of Illinois and New York University, and now lives in Bethany, Connecticut with his wife, Nickie, and their two daughters, Stephanie and Melissa. ➤



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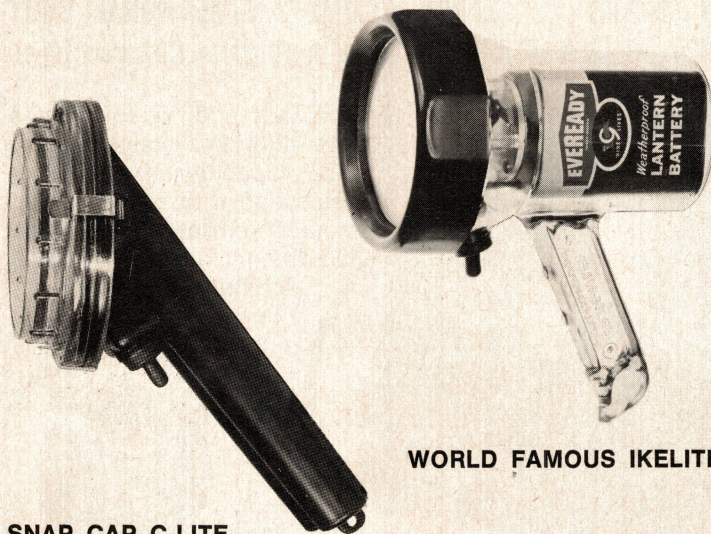


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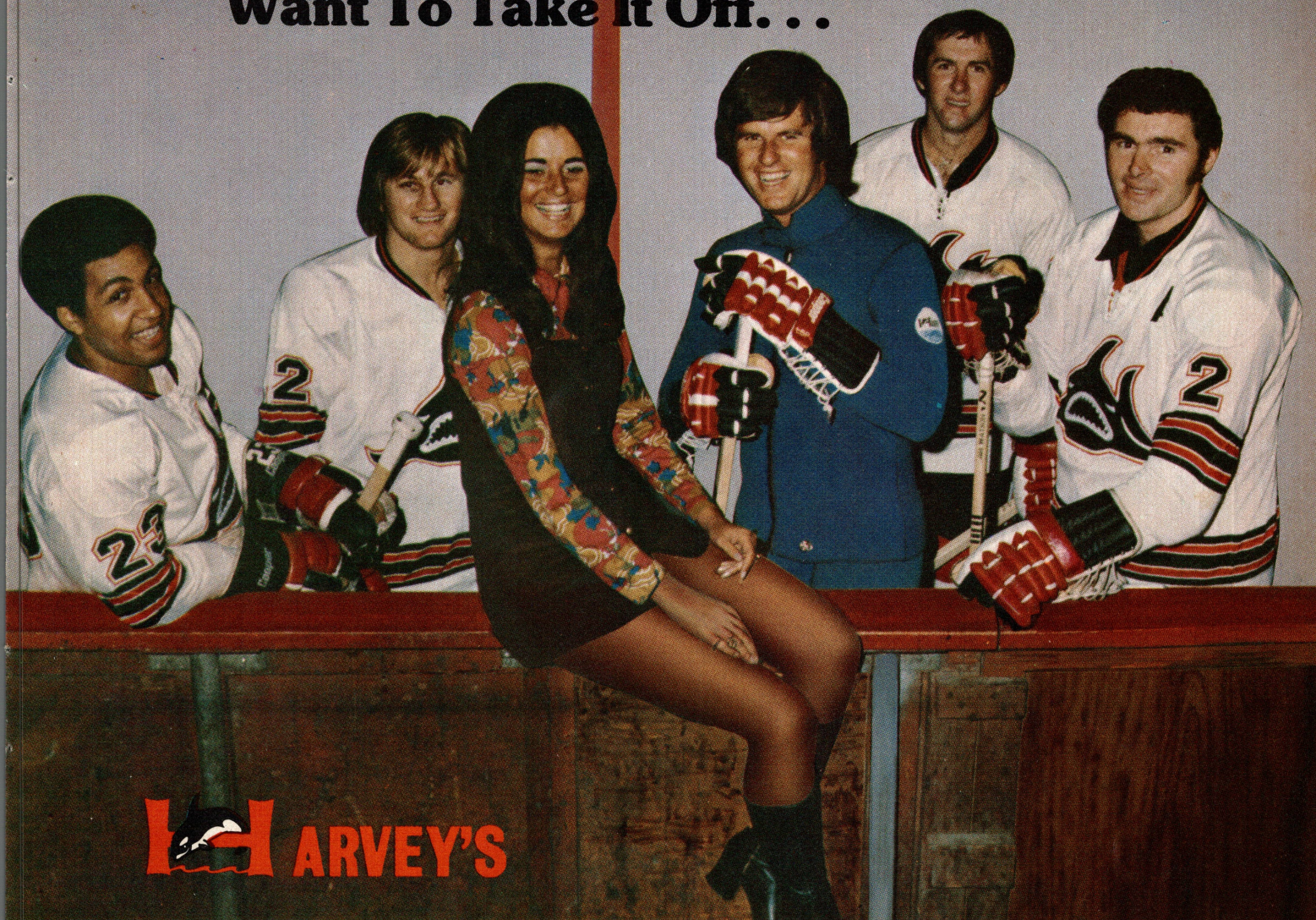
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16 SKIN DIVER/APRIL 1974

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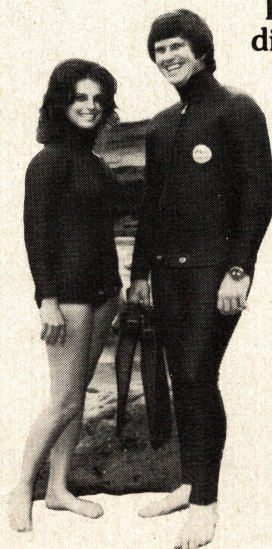


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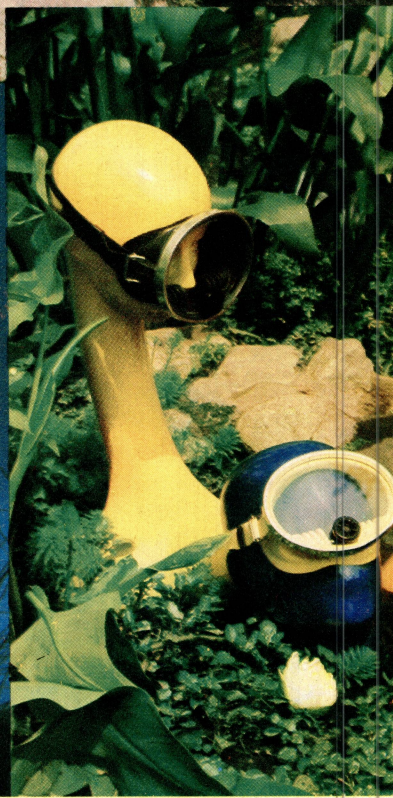


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Jacques-Yves Cousteau, Chairman of the Board



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April 6

Underwater Symposium, Harvard University, 11 a.m.-4 p.m. Film Review, John Hancock Hall, 8 p.m. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)

April 7

NAUI Diving Equipment Exposition & Seminar, Beverly, Ma. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, Ma. 02117)

April 13

Yale Sub-Aqua Club Symposium, Connecticut Coastal Conservation and the Diver, Yale University. 9 a.m.-5 p.m. (Contact: Betty Hayden, 531 Whitney Ave., New Haven, Ct. 06511)

April 20

Inner Space Society U/W Symposium and Film Revue, Southeastern Massachusetts U., No. Dartmouth, Mass. Day-time seminars, 10-4; evening program, 8 p.m. (Contact: Walter Westphal, 507 Putnam Ave., Cambridge, Mass. 02139.)

April 20

NAUI Underwater Film Review, Columbia University, N.Y. City, 1:30 p.m. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)

April 27

NAUI Underwater Symposium & Film Review, Philadelphia, Pa. (Contact: NAUI Mid-Atlantic Branch, P.O. Drawer C, Deepwater, N.J. 08023)

May 3-5

Our World/Underwater, Sheraton-Chicago Hotel and Medinah Temple. (Contact: Joyce Markstahler, 6222 N. Cicero Ave., Chicago, Illinois 60646)

June 15-16

7th Annual National Association for Cave Diving Seminar, Jacksonville, Fla. (Contact: Robert Woolf, 5018 Kerle St., Jacksonville, Fla. 32601)

June 22-29

CEDAM Annual Meeting and Symposium, Club Akumal Caribe. (Contact: Cedam International, 5820 Burning Tree, El Paso, Tex. 79912)

September 21

NAUI U/W Film Review, Fall Edition, John Hancock Hall, Boston, 8 p.m. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)

October 4-6

NAUI 6th International Conference on Underwater Education, San Diego, Calif. (Contact: NAUI Hdqrs., 22809 Barton Rd., Colton (Grand Terrace), Calif.)

October 19

Underwater Film Review, Fall Edition, Columbia University, New York City, 8 p.m.; symposium, 11 a.m.-4 p.m. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)

November 9

NAUI Underwater Symposium & Film Review, Philadelphia, Pa. (Contact: NAUI Mid-Atlantic Branch, P.O. Drawer C, Deepwater, N.J. 08023)

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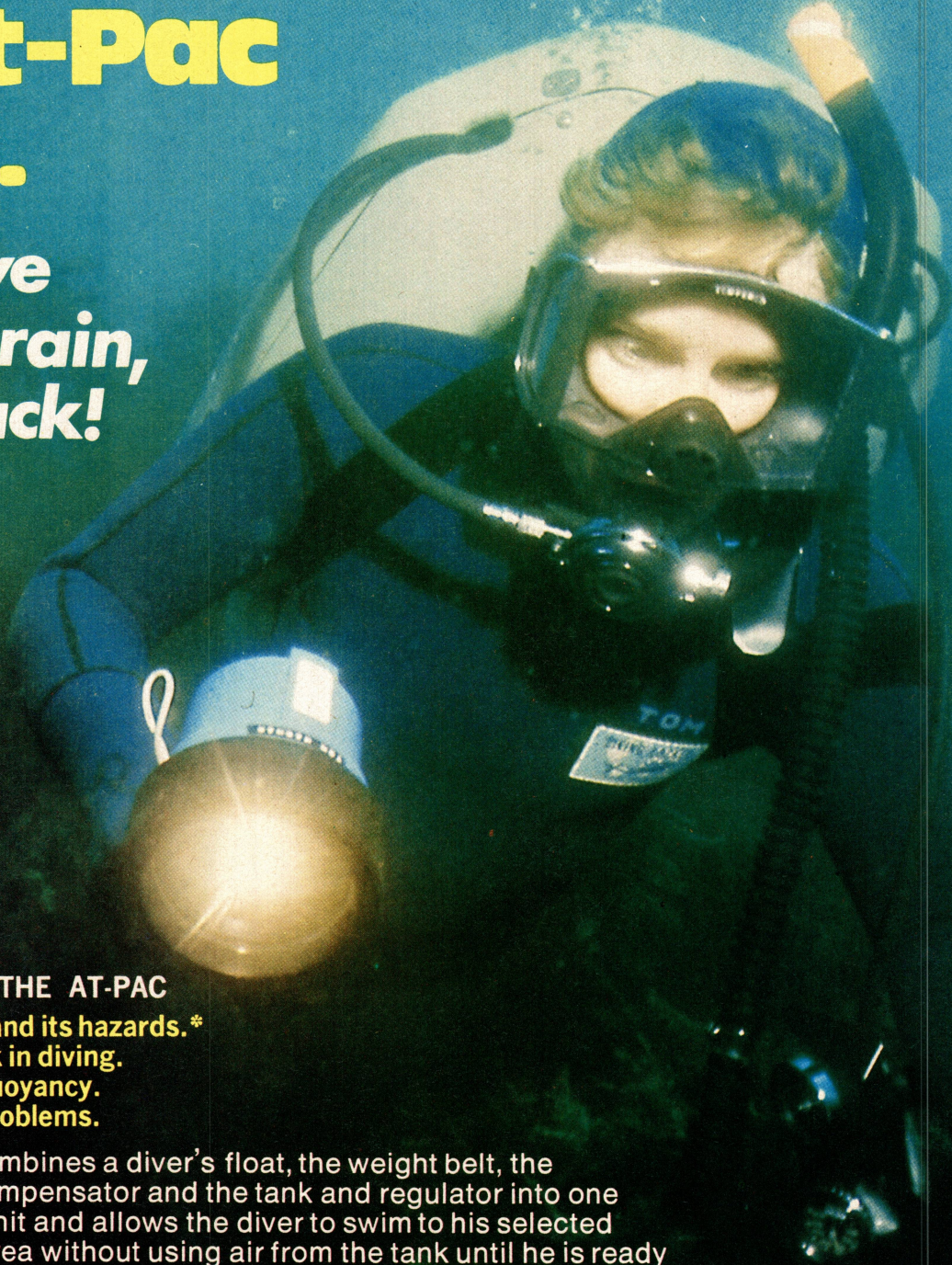
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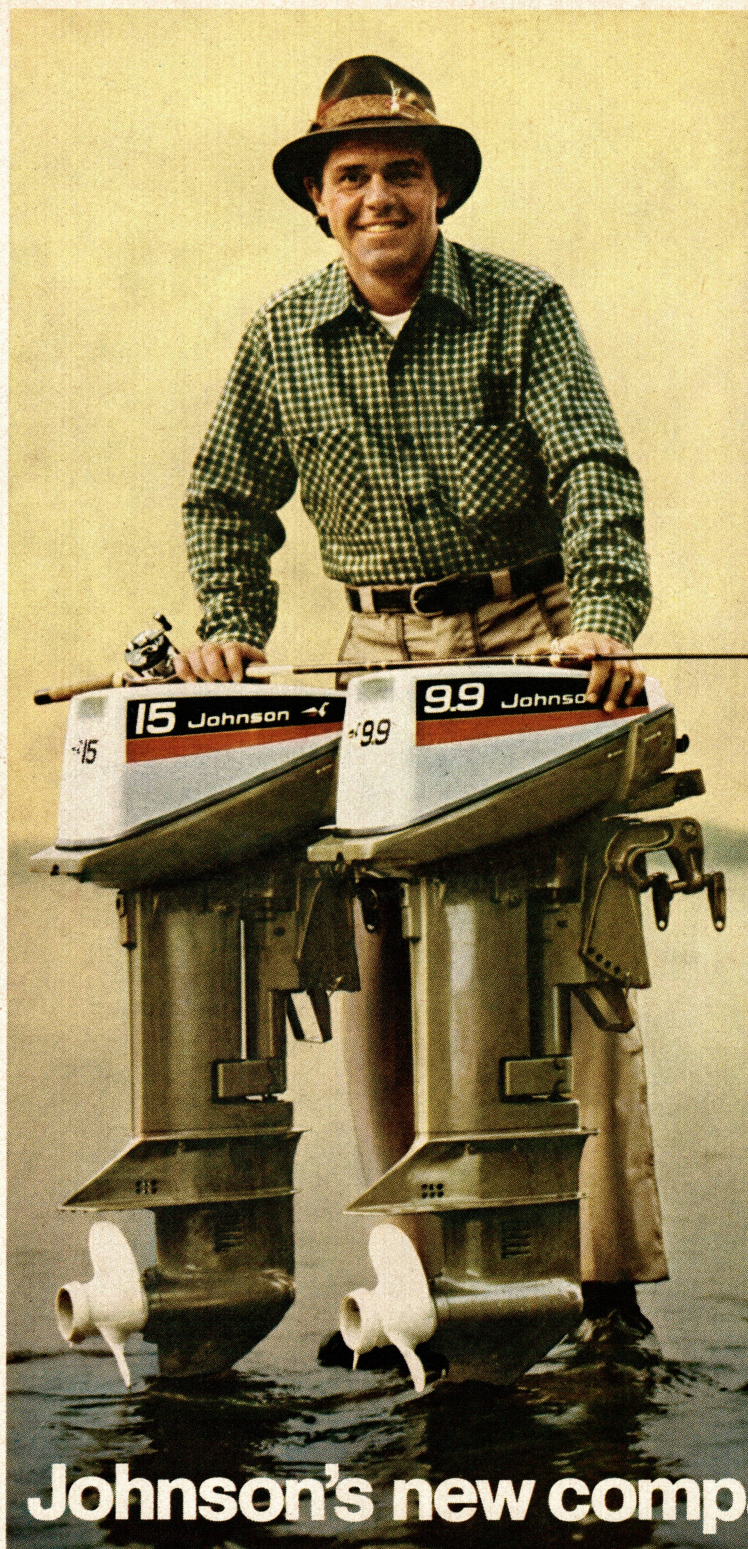
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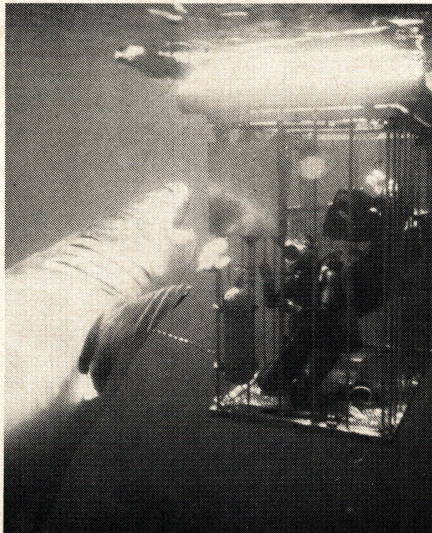
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U/W '74-NEW YORK STYLE

The Underwater Film Review is scheduled for April 20, 1974, at Columbia University, Manhattan, New York. Beginning at 1:30 p.m., the NAUI/NDA Diver Education Series presentation will highlight Stan Waterman personally narrating his new film *The Sea People*.

The Sea People is an anthology of ocean oriented adventures relating to man's return to the last frontier on this planet. Join with the first women aquanauts as they live and study beneath the sea off the coast of St. John, Virgin Islands. Follow the searchers of the great white shark as they hunt for the most dangerous of all predators on the earth. Marvel at the most dynamic experiment in sea farming. Dive with Stan Waterman as he explores the Louisiana oil rigs and finds a paradox: a new and valuable ecosystem has been born amid the 'steel monsters' that generate lethal oil spills and ecocatastrophes.



Bob Hollis, owner and operator of the Anchor Shack dive shops in California, will be on the same program. A popular diving personality, Bob most recently made the diving headlines by joining the salvors of the sunken liner Andrea Doria. He will relate the excitement of his function as diver and cinematographer in his slide series, "The Doria Divers." *Windjammer Lost*, an outstanding adventure film by Hollis, will also be screened during the film review. Fred Calhoun will be master of ceremonies for the program.

On April 21, starting at 11:30 a.m., the NAUI Diving Association will present an Underwater Photography Seminar with John Skadberg of the Ron Church School of Underwater Photography. Tickets for the seminar are \$15; for the film review, \$3.50. Contact: NAUI, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117. >



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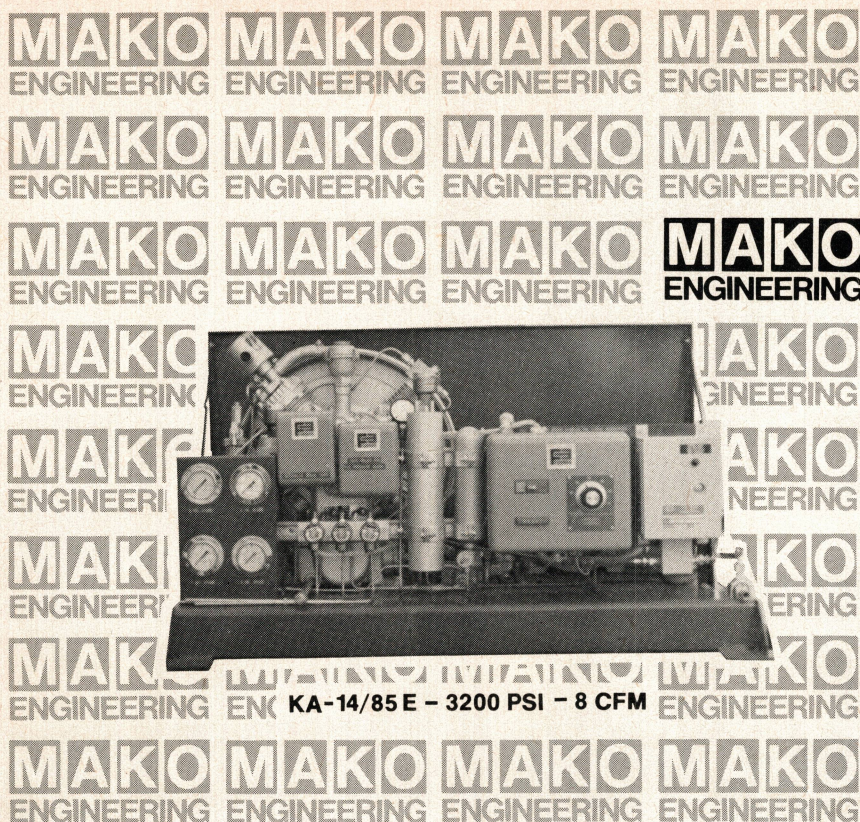
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OUR WORLD U/W

How would you like to spend 46 great hours involved in scuba diving—with no decompression stops afterwards? Our World/Underwater, which is hosting the Underwater Society of America's Convention May 1-3, is going to take the diving public on an "Experience in Depth" starting May 4, 1974, in Chicago, Illinois.

The Sheraton-Chicago Hotel, Friday night at 7 p.m., is the first dive site. Here you can say hello to Rick Frehsee, Larry Cushman, Ralph Shamlan, Jack McKenney, Lee Sommers, Frank Scalli, Tom Mount, Glen Egstrom, Zidi Mount, Al Giddings and all of the other guests that will be on hand.

All day Saturday you can do "Your Thing In Depth" at the hotel where a multitude of concurrent seminars will be held on everything from "The History of the Regulator" to "The Psychology of a Habitat Diver." These programs will take place in four different rooms from 9 a.m. to 4 p.m., with an hour break for lunch.

The formal evening film festival begins at 8 p.m. on Saturday night, May 4. It's a night dive at the Medinah Temple, and will be MC'd by Ralph Shamlan, president of Farallon Industries. Guests will see the Midwest premier of: *As Long As We're Together*, the award-winning film of a family's year in Palau; *28° Below/Above*, about Dr. Joseph MacInnis' intriguing adventures beneath the ice of the Arctic; *Behind the Scenes of Deadly Fathoms*, a dive with the first men to dive in Bikini Atoll 25 years after the H-bomb test; *Windjammer Lost*, an exciting adventure film by Bob Hollis; and *Beneath Grand Cayman Waters*, a stirring film by Jack McKenney.

Concluding the evening will be a real first! Our World/Underwater is very proud to be able to make a special presentation of a \$5000 scholarship to a deserving student to help that person pursue a future career in oceanography. The Our World/Underwater Award, which will also be presented Saturday night, will go to Dr. Glen Egstrom of UCLA. Previous winners of the Our World/Underwater Award have been the Cousteaus, Dr. Joseph MacInnis and Al Giddings.

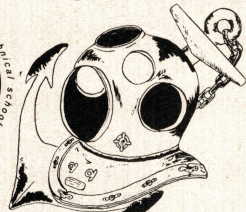
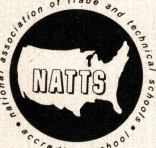
Starting at 9 a.m., Sunday, May 5, is a series of careers in marine sciences seminars. These are open only to students and educators: admission is free. Concurrently, NASDS, NAUI, PADI and the YMCA will be holding Midwest instructors meetings. This is free to all certified instructors. But there is something for everyone! From 9 a.m. to 2 p.m. on Sunday there will be a series of workshops covering how-to areas of diving. Sunday after-

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noon, from 2 to 5 p.m., there will be in-pool equipment demonstrations of new diving gear.

Tickets for the cocktail party are \$6; for the seminars \$5; for the film festival \$5; for the workshops \$2—or you can save money by ordering the special package for \$16. Contact: Our World/Underwater, Box 643, Wheaton, Illinois 60187. >

INNER SPACE SHOW

On April 20, 1974, the Inner Space Society will hold an underwater symposium and film review at the South-eastern Massachusetts University, North Dartmouth, Massachusetts.



The daytime underwater symposium will consist of simultaneous seminars from 10 a.m. to 4 p.m. Subjects discussed will be on such topics as wreck diving, ice diving, underwater photography, off-shore oil on the coasts of Massachusetts, diving legislation, open water diving instruction, underwater archaeology, diving medicine, diving equipment, commercial diving, the new role underwater for the U.S. Coast Guard and undersea habitats.

Speakers at the seminars will include many well known personalities: Dr. Harold Edgerton, Frank Scalli, Mike DeCamp, Joe Strykowski, Charlie Dennis, Brad Luther and others. Among the manufacturers represented will be Nikonos, Parkways, Poseidon, U.S. Divers, Dacor, Healthways, Imperial, Sportsways, Subsea Strobes, Delmonox Filters and Seamco.

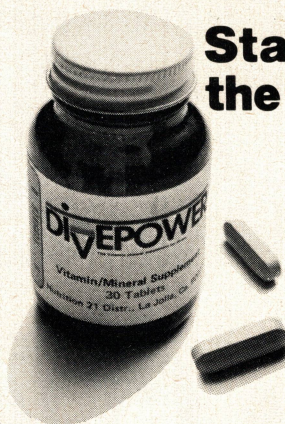
The film review will consist of fine underwater films about unique diving locations from Nova Scotia to Micronesia, and will include treasure hunting and film shots of the *Andrea Doria*. The program will begin at 8 p.m. in SE. Mass. U.'s main auditorium.

This Inner Space program is planned to be the first annual event of its kind sponsored by the Society. It is hoped that the programs will achieve a closer communication between sport divers, commercial divers and university researchers, and that continuing rapport will be established.

Tickets for the program, which are good for both events, are \$2. Contact: Walter J. Westphal, Program Director, 507 Putnam Ave., Cambridge, Massachusetts 02139. Tel: (617) 523-8531. >

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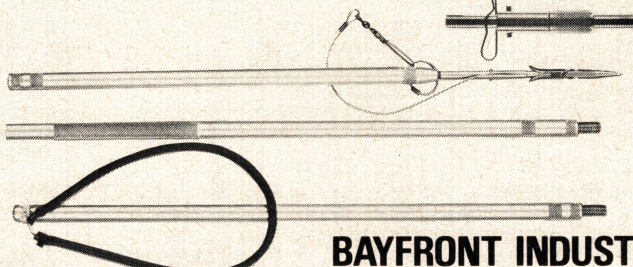
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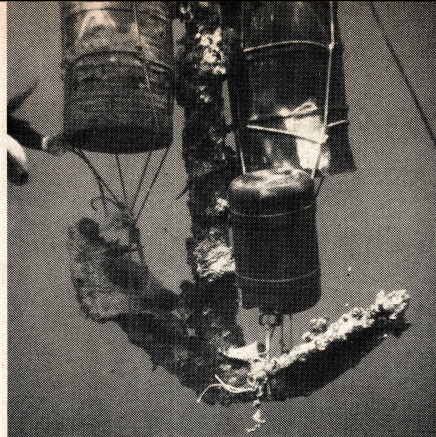
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I had originally planned a short business trip to Negril, Jamaica, to make arrangements for several dive parties. Negril's lack of telephones and vague postal service made it necessary for me to go. In discussing my plans with fellow instructors, however, the trip grew from a one man, four day business trip to a six man, seven day diving trip. So, with the snow blowing on a cold December morning, we six boarded an Air Jamaica flight at Chicago's O'Hare airport.

Once in Negril, we dubbed ourselves the Ajax Diving Team and we lost no time looking up Lester Carvalos, a well known guide in the area. "Dockie," as Lester is known, is well equipped and knows the water around Negril better than any man alive. He was ready for us, so we loaded his boat with too much gear and headed for the nearest reef where we paired off to explore at the 65 foot level.

The reef was as beautiful as I had remembered from previous trips, and it was great to be diving in water that did not require full wet suits. Charlie Holzner and Dockie were the last to return to the boat. En route to shore Charlie casually mentioned the large anchor they had seen. Though none of the other divers had seen the anchor, the subject of wrecks suddenly



photograph by Don Biging

THE AJAX ANCHOR

By Elmer Munk

dominated our conversation.

The next morning we returned to the anchor area with cameras loaded and two lift bags that Charlie had brought with him — one rated for 500 pounds and one rated for 250 pounds. The plan was for two of us

to dive and locate the anchor. The others were to follow when our marker float surfaced. Charlie and I descended and were lucky enough to locate the site within a few minutes. I uncoiled the marker line and started to attach it to the ring. For stability I wrapped my legs around the shaft, and then the fun began! I hadn't noticed the small ridge of new fire coral. Not wanting to lose my stability while tying the line, I just endured the coral. The Ajax Dive Team thought my tears and sore legs were the most amusing event of the day. Up to that point.

While the cameras ground away, Charlie attached his lift bags, and we used our regulators to pump in the needed air for the big lift. The air rushed in the bottom of the bags . . . and out the leaks at the top. Not only did we have no lifting power, it was evident that even if the bags had held, they would not have provided sufficient lift. In addition, the anchor was solidly fixed to the coral by years of growth.

On the next trip out, the dive boat looked like a refugee from a junk yard. In one afternoon, in a remote area, we had accumulated three 55 gallon drums, some 13 gallon plastic carboys, a pry bar, the jack from our car, a 45 calibre magnum powerhead,

How to rate a Deep-Sea Diving School

If you're serious about a career in deep-sea diving, save this no-nonsense, common-sense checklist. Diving schools may sound alike—but unless they can meet these qualifications, they won't give you what you'll **NEED** to pull down those high-paying jobs.

- | | |
|--|---|
| <p>1. Are your instructors commercial diving professionals? Yes <input type="checkbox"/> No <input type="checkbox"/>
"Frogmen" or "tube-breathers" may be good teachers in the service, but unless they've had years of practical experience in industrial, oil rig, or commercial deep diving, they won't be able to teach you the vital on-the-job skills you must have in deep diving.</p> <p>2. How up-to-date is their equipment? <input type="checkbox"/> <input type="checkbox"/>
You should be trained in the most sophisticated hardware available: Savoie, Miller, Advanced, Whidolf, KMB9, Aquadyne, Desco and Clamshell helmets; Electrolung, Draeger gear, and saturation unit for very deep diving; free ascent tower, under water TV and photographic equipment, etc. If you're not getting at least this, your training is incomplete.</p> <p>3. How much training under "on-the-job" conditions are you given? <input type="checkbox"/> <input type="checkbox"/>
Don't settle for easy simulations in clear-water tanks. Less than 1% of your real dives will be made in clear water. At least two-thirds of your curriculum should be practical, hands-on experience under actual conditions: murky water, tidal action, cross-currents, muddy or rocky bottoms. Anything less is a waste of your time and money.</p> | <p>4. Does the school provide adequate financing programs to meet your needs? Yes <input type="checkbox"/> No <input type="checkbox"/>
Though not important to your diving skills, this is certainly crucial to you. A good school should be approved for participation in many government, veterans, or student loan financial aid programs, and it should provide pay-as-you-go plans or deferred plans of its own without interest.</p> <p>5. Does the school promise "guaranteed placement"? <input type="checkbox"/> <input type="checkbox"/>
IF SO, GET IT IN WRITING OR GET OUT! NO ONE CAN "GUARANTEE" YOU EMPLOYMENT—in this or any other industry.</p> <p>6. Is the school's overall record in the industry a good one? <input type="checkbox"/> <input type="checkbox"/>
Is it respected among professional divers—and people that hire them? Are its graduates successful and working? Are your instructors well-known as professional commercial divers themselves? How long has the school been in operation? Is it recommended by knowledgeable diving writers (John E. Kenny, etc.)? Do some checking before you sign up with anyone. A school's reputation is based on the quality of its graduates.</p> |
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and Charlie's "now repaired" lift bags — surely enough equipment to break loose and float our challenging anchor. With fresh rolls of film in all the cameras, we were ready.

The powerhead did a great job of blasting and with the help of the jack, the pry bar, and a little muscle, the anchor was soon loose from its resting place. Our anchor now stood upright, but refused to float. It looked like a giant rocket about to be launched. We attached all the remaining containers to the flukes, and using a spare tank, began to fill them.

The drums were full; the cameras were ready to capture the raising; everyone was tensed; and . . . nothing!

Friday, our last day in Negril, dawned clear and bright with a mirror-smooth sea. Our boat was prepared for one final attempt at raising 'the anchor. One more 55 gallon drum had been located and loaded aboard the dive boat. We agreed that if this last drum didn't do the job, the balance of the dive time would be spent removing our lift equipment and the anchor would remain in its resting place for at least one more year.

Dave Robbin, Don Biging and Larry Frederic, armed with four movie cameras and two Nikonos cameras, descended first. We didn't want to miss

the filming of the final attempt on our find. Charlie and I towed the final drum into place and tied it at the base of the anchor shaft. As we filled the drum, we could feel its lifting power take effect. Like a rocket leaving the pad, the anchor slowly began to lift. The bubbles escaping from every opening in every piece of lift equipment gave us a spectacular visual demonstration of Boyles' Law.

With the tow line attached, the long trip to a suitable landing area began. Not wanting to tie the tow rope to the boat lest the lift be lost, we took turns holding the line. The job was more difficult than we had anticipated, but by some means we found the strength to get our monster moving toward the beach. To add to our woes we discovered that the last drum had not been completely empty. It had contained a small amount of lacquer which, on ascent, had been forced out and floated to the surface where it spread in a fine, nearly invisible film. Anything coming up through that film, including us, was thoroughly coated with lacquer.

Our only non-diver, Ken Botterger, had the job of positioning an old boat trailer in the surf. The trailer was pushed into about ten feet of water and securely tied to a Land Rover on

shore. By the time the tow boat arrived in the beach area, everything was ready. The anchor was floated over the trailer and allowed to sink in place. With the entire crew guiding and pulling the trailer, the Land Rover moved slowly forward bringing our trophy from the sea.

The day's activities had begun at 9 a.m., and now after raising, towing and removing our anchor from the sea, it was 2 p.m. We placed the anchor in the sand, took gasoline baths to remove the lacquer, and photographed our prize from every angle. Hans and Eleanor Gubler, the owners of the Negril Sands Club, provided a magnificent beach lunch of lobster and fine champagne to celebrate our accomplishment. Six tired but happy men, flushed with success and a goodly quantity of champagne, returned to the cottage to pack for our return to Chicago. The best dive trip any of us had ever had was over.

Well, not really over. Once back in Chicago, Dave Robbin edited the film which won a blue ribbon in the novice division of the Midwest Film Festival, and the next time we're at the Negril Sands Club in Jamaica, we'll be able to see the genuine article — our 1800 pound, 200 year old treasure from the sea. >D&B

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SDA-74

....COMMENTS FROM

EDITOR'S NOTE: The silent majority represents divers who have spoken up for what they believe is man's God given right to hunt for, and spear fish. The following letters are in reply to Philippe Cousteau's December, 1973, SDM article "Reconsidering the Speargun," and Paul Tzimoulis' January, 1974, editorial entitled, "Spearfishing . . . Where Do We Stand?" They are representative of divers who are purist spearfishermen, once-a-month spearfishermen, competitive spearfishermen, and even non-spearfishermen. To date, SKIN DIVER has received many letters regarding this spearfishing controversy. Unfortunately, we don't have room to print all of the letters, but the editors have chosen ones they feel, are representative. 1974 is going to be the year of the "Spearfishing Controversy." Where do you stand? We'd like to hear from you . . .

. . . Spearfishing is a tough, demanding sport that happens to involve spearing fish. To read your editorial makes me believe that we are blood-thirsty rebels out to kill anything that moves. This just is not true. Since this is an international sport, much of my time is spent conditioning my body. This year I went to Spain, with the U.S. Team, to free dive 60 - 100 feet deep and try to spear fish. Before this tournament I was riding my bicycle 40-50 miles per day to build up my cardiovascular system to endure the two consecutive six hour competition days. Weight lifting was concentrated in the chest area to enable me to inhale a larger breath. As a team we practiced repetitive free dives to 100 feet off Bird Rock, Catalina. All this conditioning did not involve any fish. And this is where most of my time is spent when I practice "spearfishing." As an athlete I cannot understand your stand on this issue.

Now comes the evil part—the spearing of fish. I eat fish at least four times per week. I like seafood and since I'm in the U.S. Army, it is a good way to cut food costs. The only time I spear fish that I don't eat is during the competition meets. I do not think this is "killing for the sake of killing." Our rules are set up to donate all the day's catch to charity. This is done to stop the divers from taking the best fish home and leaving only the leftovers. In this day and age, it is not a problem to find worthy people who want the free fish.

I consider myself an ecologist. I can see that our liquid environment is not getting better. I have taken many oceanography classes. I've studied worldwide pollution charts and curves on the supply and demand of our fishing fleets. The fishermen are falling behind in trying to supply the world. The scientific answer is to drop one step in the food chain of fish. It takes ten pounds of plankton to support one pound of fish. Harvest-

ing the greater quantity of plankton before it is eaten by the fish would seem the logical solution. I don't believe in this. Our oceans will continue to degenerate if this practice is started. I favor a ban on all fishing of our oceans. Everyone's cooperation is needed to stop this endless siege on marine life. It is redundant to ban spearfishing and then go out and buy fish. This isn't saving any fish. The same amount is consumed. Actually, less waste is incurred when each individual diver cleans and prepares his own fish. I put myself in the same place as Jacques Cousteau on his T.V. specials. He eats all different types of seafood on many of his shows and I like this type of food as much as he does.

So why pick on the spearfishermen? It seems like you have a personal vendetta against us. Why are you taking a stand against our organization which has the least ill effects on the ocean environment? You should be editorializing against the commercial fishing industry. Why not help your fellow diver? If restriction or restocking of certain areas is needed, your magazine would be of great assistance. If the individual novice diver is the biggest violator of game regulations, he can learn by reading about organized meets. As you have stated, we are not well organized, but I'm sure a man in your position could help this sport greatly.

If spearfishing is "socially unacceptable" it is because this is the attitude a few influential spokesmen have put to the public. Another reason spearfishing is not too popular is because it does not involve any big money transactions. There are no expensive scuba tanks or cameras to sell. And where there is no money, there is no support.

BILL ERNST

MONTEREY, CA.

. . . My reaction to Phillippe Cousteau's announcement of U.S. Divers' decision to discontinue the manufacture of spearguns and associated equipment was mixed. By nature a conservationist, I am also a diver, who has many times speared fish for the table. I, too, have felt the twinge of regret that always accompanies the act of killing an unsuspecting grouper at close range.

Yet, I feel that this sensitivity—the same sensitivity so obviously manifested by young Cousteau—is, perhaps, a luxury that we can ill-afford in this protein-impooverished world. There are few conservationists among the earth's poor and hungry millions.

Would Cousteau prefer that all the fish from the sea be captured by the vastly more efficient, but less selective and more insensate methods employed by the commercial fishing fleets? However insignificant the impact, each time a spearfisherman provides his family with a free meal from the sea, he lessens the demand and subsequently the cost of meat.

I think our conservation efforts would be better directed toward the establishment of vast underwater sanctuaries—such as Pennekamp and Point Lobos — where we might seasonally share in the ocean's harvest. We have nothing to gain by taking a vertical slash at spearfishing; thus, eliminating one of our growing sport's most exciting facets.

CDR JOHN D. THURBER

FPO NEW YORK

. . . I believe I am what may well be considered both a conservationist and a spearfishing enthusiast, in that ever since I started spearfishing, I've been building my own private reef in order to replenish my catch.

The reef in construction is nothing fancy but it serves the purpose for

THE SILENT MAJORITY

which it was built, that is to provide plenty of nooks and crannies in which small marine animals can breed unmolested, and to attract larger fish for both viewing and occasionally spearing for food. The structure of my reef is quite simple. Everything needed to build one like it is generally readily available, starting with old rubber tires for the foundation, broken up cinder blocks, large rocks, riffraff from concrete buildings, a couple of old row boats, and the main ingredient, oysters.

The tires provide enough surface area to keep the riffraff from sinking into the soft sandy bottom on which the reef lies. The oysters not only provide unlimited hiding places between their shells for small marine animals but also attract some of the larger critters for food purposes and also, through their reproduction, provide for a potentially never ending growth of the reef.

Although visibility in this area rarely exceeds thirty feet, that is still plenty to view about half the reef's area, which is now approximately six hundred square feet. Among the several species of marine life which frequent this small stronghold of nature are: mangrove snapper, sheepshead, grouper, snook, crawfish and a couple of three foot barracuda.

I don't want to sound sacrilegious against the forefather of the reason behind my ever becoming involved in diving, but I think man and fish are two very compatible creatures, whether the fish be in the wild or in the plate, and I don't think that banning of speargun sales is even a partial answer to the elaborate problem at hand.

JOHN MASCIA

FT. PIERCE, FL.

... In regards to your editorial entitled "Spearfishing, Where Do We Stand?" As a former competitive vice president of the Underwater Society of America I have attended and supervised four different North American Scuba Championships. All were held in fresh water and all included the national scuba spearfishing championships as one of the events. It may therefore come as a surprise

to some that I agree quite strongly with most of the views stated in your editorial. Spearfishing as you described it is enough to turn your stomach, and I am quite certain that in many areas your description is accurate. On the other hand I feel you failed to include the total picture as it applies to many organized diving councils. Therefore I would like to take this opportunity to add a few remarks on their behalf, especially the inland divers. No doubt you will hear from others concerning the defense of the saltwater spearfisherman.

In many states, through the efforts of the organized councils and the Underwater Society of America, laws have been revised to permit the spearfisherman to take the same legal limit of sport fish as the line fisherman. Yet these councils, after having obtained these laws, imposed self restrictions prohibiting the shooting of game fish in any organized competition. Further, they require any member who shoots fish outside of competition to clean and eat his catch or be subject to loss of membership.

You mentioned game management and the fact that the line fisherman's money for his license goes toward the raising of more fish in hatcheries. What was overlooked is the fact that the inland diver must purchase the same license as the line fisherman. Therefore, while he rarely shoots game fish, he has paid his fair share toward their replacement if he chooses to do so.

In the inland lakes many rough fish such as carp have extremely strong survival tendencies. They have therefore multiplied in such numbers that many state fish and game agencies have classified them as a definite danger to the various species of sport fish. In some areas serious thought is being given toward draining some of the lakes to kill the rough fish and then restocking with game fish only. These same professional ichthyologists have stated that if all the skin divers in their state were to hold a competition in a particular lake every weekend for a year, the most they could hope to accomplish would be to hold the rough fish population static — let alone reduce it. In light of this knowledge, in several states

the bass fisherman's clubs are joining with the diving clubs for the coming season. These organizations which once thought they were enemies now find they compliment each other in helping maintain the ecological balance of our inland lakes.

In most inland councils, fish taken during organized competitions may not simply be disposed of by sacking and weighting, nor by other wasteful means. Even though they are only rough fish, the council requires the hosting club to make advanced arrangements to put these fish to some useful purpose. This has been done in many ways, but one such method that comes to mind immediately, has been the donation of the fish to an area school for the underprivileged. To the over 1000 students in this school, the holding of a competitive spearfishing event in their area has come to mean much more than a mere athletic competition. It means one of the few times they can go to bed in this land of plenty, without feeling the pangs of hunger. Try telling these teenagers sometime that spearfisherman is a dirty word.

During one of the more recent national championships I witnessed a fantastic sight — sportsmanship beyond equal in any of today's modern sports. Especially in many of today's win-at-any-cost type of professional sports being shown on television to today's youngsters. At one time there were no less than a dozen competitors helping an aged and crippled line fisherman and his wife set up their lakeside camp site . . . The examples of sportsmanship that occurred that weekend were so numerous they are beyond elaboration here.

I do not claim the organized spearfisherman to be a saint. Neither will I admit him to be that awful devil he is sometimes painted to be. Your editorial certainly stated some things that have long needed saying. Congratulations. The sad part was that it described only that group of competitive spearfishermen who still live in the past, while excluding many of today's competitive councils who have learned the truth of that certain TV commercial, "It isn't nice to fool mother nature."

JIM I. BROWN

JOPLIN, MO.

BEWARE OF UNDE

By Albert L. Pierce

Experienced skin or scuba divers in good physical condition, who are used to swimming underwater without air, may be more liable to black out underwater than others! Obviously, anything which could cause a blackout on the surface — a heart attack, fainting spell, stroke, shock or a blow on the head — could also cause a blackout underwater. Unconsciousness quickly becomes very serious if there is no air to breathe. These are things we all know. However, there are some things that are not so obvious that a breath-hold diver might do unthinkingly that would cause him to black out underwater.

Hyperventilation — Most skin divers are aware of the problems which result from excessive hyperventilation before prolonged underwater swimming. The deep, rapid exchange of air when hyperventilating reduces the level of carbon dioxide in the body without a corresponding increase in oxygen. Since a high carbon dioxide level is the primary signal that tells a person he needs air, he may run out of oxygen before this air-hungry signal gets very strong. Whenever there is too little oxygen in the blood supply to the brain, he will black out. And there are no reliable symptoms to tell him when the oxygen in his blood is too low.

Exercise — Swimming underwater frequently involves strenuous muscular activity. This will use up oxygen much more rapidly, thus increasing the possibility of blackout. Swimmers have been known to continue swimming motions underwater even after they have lost consciousness.

Mind Over Matter — A diver can convince himself that he doesn't need air when he actually does. It's a mind over matter deal. In effect, he hypnotizes himself into disregarding the air-hungry signal until it's too late. Unconsciousness results. This is especially likely to happen when pursuing a goal such as trying for increased time, distance, or depth — or when going after an elusive fish.

Up from the Depths — There is

photograph by Patricia McNamey

RWATER BLACKOUTS!

(WELL-TRAINED DIVERS, ESPECIALLY!)

another problem, fairly well known to skin divers. As the breath-holding diver goes deeper, oxygen is taken up more readily by the body due to the increased partial pressure of oxygen. But, as he returns toward the surface, the partial pressure of oxygen drops drastically. In severe situations, after staying deep for too long, the oxygen actually passes the wrong way, from the blood to the lungs instead of from the lungs to the blood, thus robbing the blood and tissues of vital oxygen. Such a quick reduction of oxygen to brain tissues can cause the diver to black out in shallow water before reaching the surface.

Diving Reflex — Divers familiar with the history of diving will remember that back in the 1880's a Frenchman named Paul Bert wondered why some divers and workers breathing compressed air were dying or suffering pain and crippling injuries. His experiments with animals in pressure chambers revealed the reason: nitrogen bubbles in the blood and tissues of the body.

Bert discovered something else. He found that when ducks submerged, their heart rates dropped drastically from about 100 beats per minute to approximately 14 per minute. This phenomenon, now called the diving reflex, has been found to be common to all aquatic mammals, and is believed to be one reason these animals are able to stay underwater for periods as long as one half hour or more. This slowing of the heart rate, called bradycardia, is one manifestation of a rerouting or shunting of oxygenated blood from the extremities and viscera of the body, where it is not vital, to the brain and heart, where it is essential for maintaining normal life processes.

People also have this diving reflex, some more than others, although it is usually not nearly so pronounced as in aquatic mammals. This sounds like a bonanza for breath-hold divers. If you have a strong diving reflex you might be able to hold your breath longer and thereby enjoy more time to explore the depths. However, this may not be the case.

I conducted a study which involved

the testing of 35 divers in the Philadelphia Sea Horses scuba club. Their heart rates were measured while they held their breaths with faces submerged in a basin of water. (Earlier studies had shown that only the face needed to be submerged for the diving reflex to occur.) The heart rates of most of these divers dropped within the first 20 seconds. The rates of those divers who stayed under long enough also dropped after about two minutes, and dropped again just before the end of the breath-hold.

I found only slight, not significant correlations between breath-holding ability and the diving reflex. However, this study did show significant correlations between both the age and years of swimming experience of the diver and the degree of his heart rate drop. One older diver's heart rate dropped precipitously to only nine beats per minute before he resumed breathing. (Note: This is greater than Paul Bert's ducks!)

Another study (by Bove, Lynch, Connell and Harding) of scuba divers belonging to the Abington Submariners club in Abington, Pennsylvania, revealed that the diving reflex was significantly more pronounced among divers who were in good physical condition. And an article appeared in *Aerospace Medicine* (Mar., '73) which may help explain why some experienced divers in good physical condition have drowned.

Measurements of the expired air from the lungs following some of these breath-holds revealed that the partial pressure of carbon dioxide was not very high; not enough to likely provide a strong stimulus to breathe. It is reasoned that the progressively low oxygen level in the blood, late in the breath-hold, monitored by chemo-receptors in the arteries, may be the cause of this second drop in heart rate. This reduced output of blood from the heart, even though shunted selectively to the heart and brain, will ultimately result in insufficient oxygen to the brain and unconsciousness will follow.

In other words, if one holds his breath beyond two to two-and-a-half minutes, his heart rate may drop to

a new low level, possibly reducing the circulation of blood, already deficient in oxygen, to the brain and cause a blackout.

Scuba Divers — Obviously, when a scuba diver runs out of air underwater, or even if he waits long periods between breaths to conserve air, he becomes a breath-hold diver, and is subject to all these blackout factors — in addition to the possibility of air embolism or the bends. Even if the diver doesn't have a strong urge to breathe, he should realize the many possibilities of lapsing into unconsciousness and act accordingly.

If the diver has become excited and has hyperventilated before running out of air, his carbon dioxide level will be low, and correspondingly his air-hungry signal will not be strong, so he may black out from lack of oxygen before he knows what is happening. Extra muscular effort — from panic, to catch up with a fast disappearing buddy, to free himself from entanglement, to manipulate bulky equipment, or to streak for the surface — will use up oxygen faster and may cause an early blackout. On approaching the surface, the diminishing partial pressure may cause a reduced or even reverse flow of oxygen, thus robbing the blood and tissues in the brain of oxygen, and cause a blackout in shallow water.

Even if he has escaped blackout from these other causes, a diver's heart rate may be so slowed from the operation of the diving reflex that his brain will receive too little oxygen, and he may black out from that. Remember that studies have indicated that older, experienced swimmers and those in good physical condition are likely to have a more active diving reflex.

Be Wary — It all adds up to this: Swimmers, breath-hold divers and scuba divers — especially older, experienced swimmers in good physical condition — should avoid overextension of their times and depths underwater without air. They should also be wary of hyperventilation and excessive exercise underwater. Scuba divers should avoid trying to conserve air by excessive breath-holding. >



LET'S GET

Over the years a number of agencies have kept statistics on diving-related accidents, fatal or non-fatal. I have been associated with the Los Angeles County Underwater Safety Committee since 1965 and have examined over 100 fatal diving accidents in the southern California area with them. When NAUI started its International Diving Accident Investigation Project in 1972, I became its project director. An important part of NAUI's project is the evaluation of "near misses" to get a better insight into why diving-related accidents begin. What systems fail? What errors of commission or omission occur? It is my opinion, based on work done with both agencies, that perhaps 60 to 70 percent of our accidents could be avoided through reasonably simple changes in our equipment requirements and in our teaching techniques. The need for one such change is blatantly obvious.

Between 35 and 40 percent of the fatal diving accidents in the southern California region over the past eight years might never have occurred had the victims been equipped with, and had been properly using, submersible pressure gauges. This statistic shouldn't be surprising. The most devastating

thing that can happen to a diver is to unexpectedly run out of, or run extremely low on, air. It takes an extremely cool individual to do all the right things when this occurs. We may simulate these conditions with our students in the pool to see if they respond correctly, but this make believe isn't even close to the real thing when it occurs in an open water situation.

The fact that we send novice divers into the water without pressure gauges is bordering on gross negligence.

As an industry, as a sport, as a way of life for many, we simply cannot continue to ignore what is happening. We are putting people into an environment where their most valuable possession is their air supply and we are not insisting that they be in a position to know exactly how much air they have left. Why? Some shops don't want the added expense of pressure gauges on their pool equipment, they don't want the added maintenance expense, gauges mar the pools, J-valves are good enough . . . the rationalizations go on and on.

One thing that divers seem to be in concert about is their lack of agreement on many questions. In this case, however, the pressure gauge is the best answer there is to the out-of-

air problem. The J-valve just doesn't cut it! Too many times it was already down when it should have been up. Too many times the panicked diver forgot all about it when that awful moment arrived. The new sonic regulators may have merit, but I feel that divers should be trained to know exactly how much air they have at any point in the course of the dive.

Almost all divers with extensive diving experience have had their share of "near misses," some of which included out of air situations. They free ascended, they buddy breathed, but whatever they did, they did it right. That they survived the air problem is a tribute to their coolness, the good training they may have had, or both. But the real question is, why didn't they know how much air they had left before it became a problem? Simply because they didn't have the right instrument to tell them. How simple, how inexpensive and yet how directly to the point a submersible pressure gauge is. Even Volkswagen took the J-valve out of the "Beetle" and put a gauge in. We must do the same and we should do it now.

In the instructional field, we are constantly hoping and praying that we won't have to contend with some

photograph by Jack McKenney

IT ON!

USE OF GAUGE COULD REDUCE DIVER FATALITIES 30 TO 40%

By Ralph M. Singer



type of arbitrary legislation which may be invoked as a result of the hue and cry which is raised whenever there is another diving fatality. Yet here within our grasp is the possible large-scale reduction of our annual number of fatal accidents through the use of a simple device which should be standard equipment on every diver.

We should simply not teach people to dive without being thoroughly schooled in the necessity of, and proper use of, submersible pressure gauges. We should endeavor to equip all pool regulators with gauges and shops should begin renting regulators only with gauges attached. This should be a voluntary action, but by making it an industry-wide effort, we will demonstrate that we are sensitive to our own problems and are taking the steps which are necessary for our own safety.

Manufacturing could assist by working out favorable pricing on gauges which are to be used in pool training. That they are ultimately going to sell more gauges will help motivate them, but I think that most of the people who manage the manufacturing end of diving are far-sighted enough to be looking at the future of the sport.

As far as the divers themselves are concerned, the trauma of having to spend an additional \$20 to \$40 to equip themselves safely is a short-term problem and will be more than offset by the confidence he will gain in his diving. He must, of course, be taught a great deal about the gauge and the methodology of its use. How many pounds of air constitute a safe reserve level at a given depth? How should a gauge be maintained and how frequently should it be tested for accuracy? Where should the gauge be properly worn for ease of visibility and lack of entanglement? How can we best protect training pools from gauge boot damage and how can we best protect the training gauge itself from pool damage? These are some of the secondary questions that the diving public must have answered and answered on a reasonably uniform front. NAUI, PADI, YMCA, NASDS, LACO, SKIP and other certifying agencies should be able to reach standard answers to these questions just as they should be teaching standard signals for out of air, low on air, I want to buddy breathe, etc.

We have within our grasp the means to sharply reduce the number of fatalities which plague our sport. We must act quickly and decisively.

If you have ever had a diving accident send in the adjacent Diving Problem Report Form. NAUI needs your input to produce results to make diving safer.

DIVING PROBLEM REPORT FORM

I have had a diving problem situation. I have checked some of the equipment and/or physical problems that were involved. A thumbnail sketch of what has occurred is included in the hope that through my "problem"—perhaps diving can be made safer.

Breathing equipment was a factor:

- ☐ Ran out of air
- ☐ Ran low on air
- ☐ J-valve failed
- ☐ J-valve was down when I thought it was up
- ☐ Regulator malfunctioned
- ☐ I had forgotten to turn my air on

Explain briefly: _____

Buoyancy system was involved:

- ☐ Vest was inadequate
- ☐ Could not inflate vest
- ☐ CO2 did not fire
- ☐ Could not vent air quickly enough for slow ascent
- ☐ Vest leaked
- ☐ Forgot to wear vest

Explain briefly: _____

Weight belt system was involved:

- ☐ Belt became caught in other equipment and wouldn't drop
- ☐ Buckle jammed
- ☐ Buckle had twisted around to point it couldn't be reached
- ☐ Had too much weight
- ☐ Had too little weight
- ☐ Forgot to drop belt
- ☐ Embarrassed to drop weight belt

Explain briefly: _____

Was there a mask involvement? Explain briefly: _____

Was there a fin involvement? Explain briefly: _____

Physical data: Became exhausted ☐ Became disoriented ☐ Began to hyperventilate ☐ Became panicked ☐ Explain briefly: _____

Water conditions:

Dangerous surf ☐ Strong current ☐ Water visibility ☐ Other (Explain briefly) _____

Buddy system: Became separated from buddy ☐ Problem developed while attempting to buddy breathe ☐ Buddy was the problem ☐ Explain briefly: _____

Entanglement: Kelp ☐ Weed ☐ Fish net ☐ Cave entrapment ☐ Other (Explain): _____

Brief summary of diving problem (use additional paper if necessary): _____

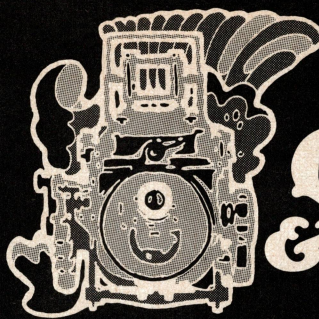
Mail to: NAUI International Diving Accident Investigation Project, NDA Headquarters, 22809 Barton Road, Grand Terrace, Calif. 92324.

The purpose of this article is to present a method of calibrating an exposure meter/camera combination for underwater use by means of an adjusted ASA rating.

Exposure errors — The exposure settings indicated by an exposure meter may not be sufficiently accurate for exposing color slide film underwater. Some of the reasons for this inaccuracy are: (1) The response of the meter to light may be too high or too low. (2) The amount of light transmitted to the meter may be affected by the meter housing. (3) The amount of light reaching the film—after passing through the housing faceplate and several glass lens components—may not be accurately indicated by the f-stop number of the lens aperture. Different lens systems can transmit different amounts of light to the film regardless of the f-stop. (4) The actual shutter speed of the camera may be faster or slower than that indicated by the shutter control. (5) The techniques of using the light meter may be faulty. °

Above water testing — Before making more elaborate underwater tests, give the meter a "quickie" test above water. With an average subject, front lighted with bright sunlight, the basic exposure should be f16 at a shutter speed of one over the ASA rating. With ASA 64, this would be f16 at 1/60 second (the shutter speed closest to the ASA). If the meter reads at, or close to this basic exposure, the meter itself is probably accurate. The next step is to make test exposures underwater.

Underwater testing — This consists of making a series of test exposures bracketed around an exposure meter reading. Perform the test in the locale where you usually



UNDERWATER
PHOTOGRAPHY

Quick & Easy

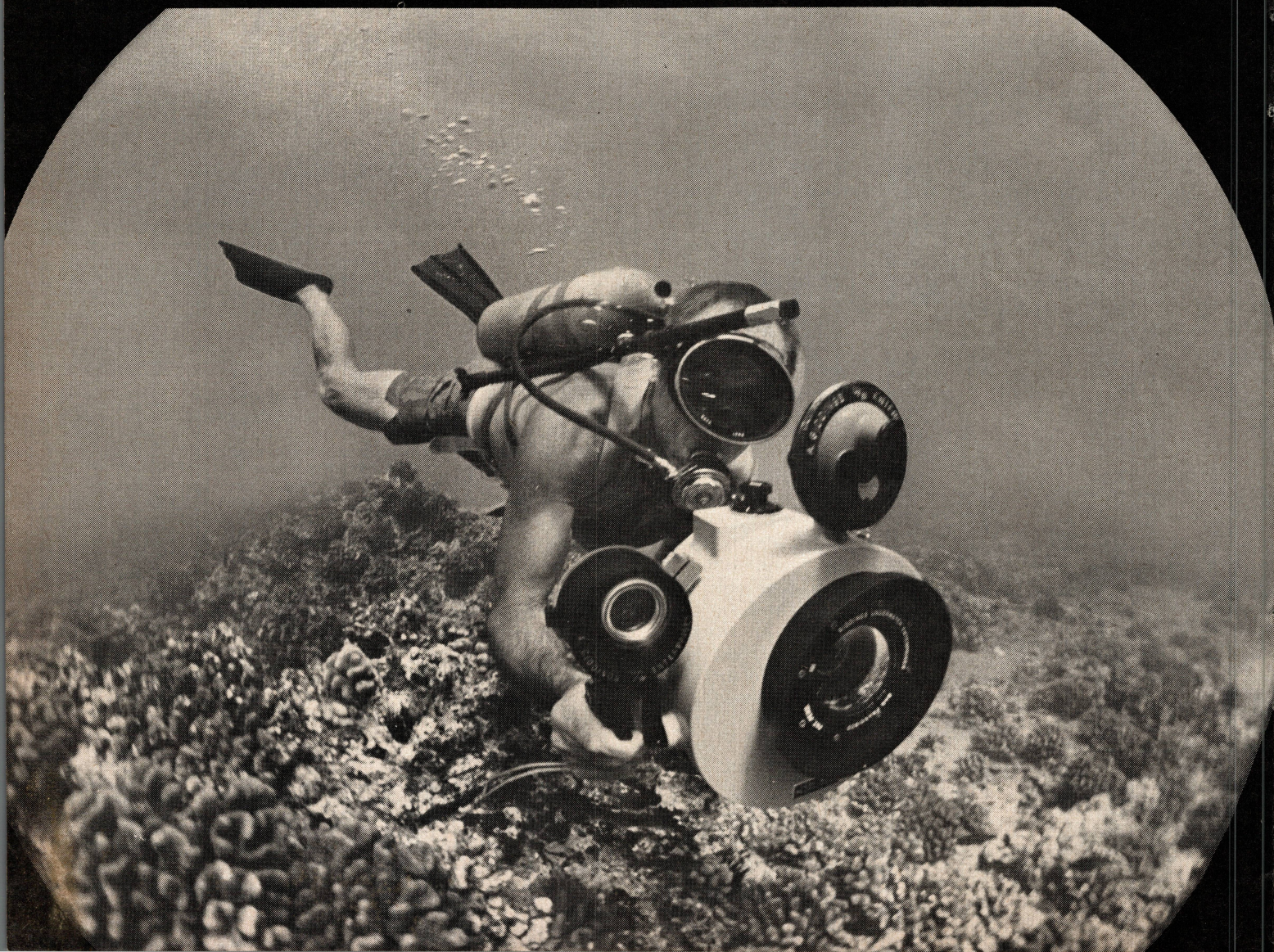
PART XL

FINDING AN ADJUSTED ASA RATING

By Jim and Cathy Church



photograph by Paul Tzimoulis



dive, and with subjects you usually photograph. The procedure can be repeated with several different subjects.

Use the slowest color slide film possible in the light conditions of your locale. The slower the speed, the less the latitude, and the easier it is to determine a correct exposure by eye. Most black and white and color negative films have too much latitude for this procedure. While Kodachrome II (ASA 25) is an ideal test film, you may have to use Ektachrome-X (ASA 64) to compensate for low light levels. A shutter speed of 1/30 second can be used to allow a wider range of f-stops for bracketing. Although this slow shutter speed may cause blurry pictures because of camera movement, this test is to determine exposure rather than image sharpness.

Select a stationary subject, such as a large sea anemone, and settle yourself on the bottom. If the subject has both dark and light areas, select a light area and ignore all else. Take a careful meter reading off the selected subject area. Record the reading on a slate.

Take a series of bracketed exposures at an apparent distance of about three feet. Expose at one stop under, one-half stop under, at the meter reading, one-half stop over and one stop over. Take a second meter reading immediately after the last exposure to make certain that lighting conditions haven't changed during the test.

Project the processed slides and select the one with the best exposure—judge only the pre-selected area from which the meter reading was made. Determine what f-stop was used for this exposure.

Suppose the best exposure was made at f5.6 and 1/60 second with ASA 64 film, but the exposure meter had indicated f8 as the optimum exposure. Set the circular dials of the meter for f8, 1/60 second and ASA 64. Then, rotate the dial to show f5.6 at 1/60 second. Look at the ASA indicator. It will now show ASA 32, the "adjusted ASA rating" you should use with ASA 64 film. As 32 is one half of 64, your method of adjustment would be to divide any ASA rating used by two.

Check your techniques — Working out adjusted ASA ratings for your meter/camera is only half the problem. You must learn how to use the meter effectively.

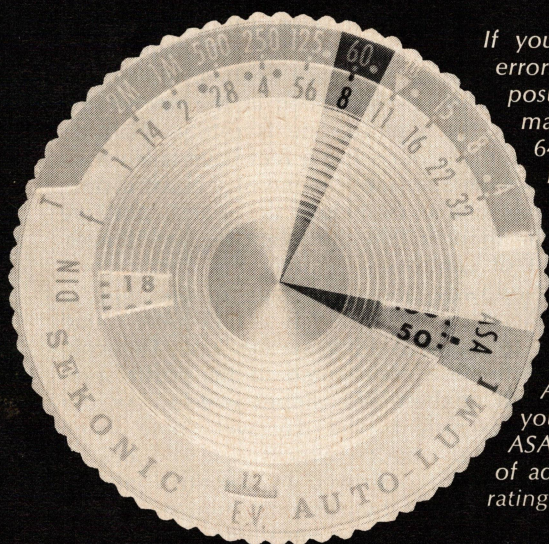
Pleasing color exposures are often difficult to achieve.

To begin with, your eyes view underwater scenes subjectively. Much of the color they perceive is the result of memory—colors seen as your mind remembers them, not as they actually appear in the blue-green undersea world. Likewise, your eyes automatically adjust for differences in brightness that are beyond the latitude of color slide film. To estimate how a scene would appear on a slide, squint your eyes as you view the subject. The shadow areas will appear to be much darker than it normally does; often seeming totally black.

When the contrast range of the subject is greater than the latitude of the film, the exposure meter reading should be based on the lighter subject areas when taking color slides. For example, assume you are photographing a diver under a kelp forest. Your exposure meter gives readings of f4 from his wet suit, f5.6 from the kelp stalks and f8 from the midwater background. Your ASA 64 color slide film (with about a half-stop of latitude) can't record the entire range of contrast from f4 to f8. Even if the exposure were made at the midpoint of f5.6, the diver would be underexposed, and the midwater background would be pale from over exposure. The best procedure is to expose for the highlight of f8 and let the diver and kelp stalks go dark. The resulting slide will be a silhouette of the diver and kelp against a brighter background.

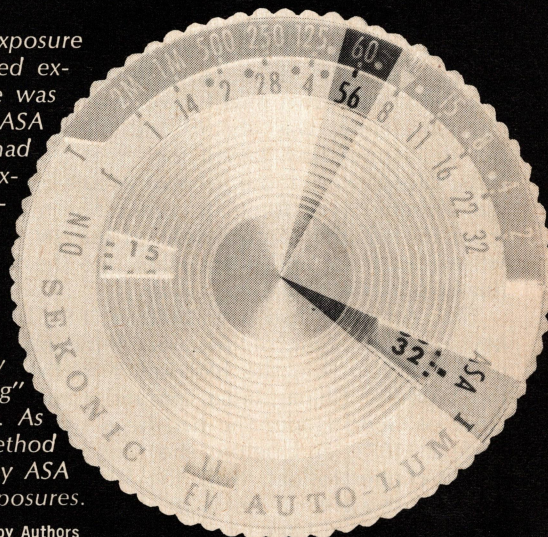
Black and white films have greater latitude and some manipulation of exposure can be done in the darkroom. The general rule is to expose for the darker areas with black and white rather than for the lighter areas as with color slide film. Given the same situation—the diver under the kelp—we would have exposed at f5.6 rather than f8. However, when a definite silhouette effect is desired, expose for the highlights.

Other problems — When taking exposure meter readings with housed meters, such as the Sekonic L-86, do not tilt the meter back to your face to see the light-response dial—this aims the photocell upward at the brighter surface which will give a false reading. Also, do not let the meter float upward aimed at the sun. The meter may "remember" this exposure to intense light and give higher readings than normal when used in the dim underwater light on the bottom. ➤



If your pictures consistently have exposure errors make a test series of bracketed exposures. Suppose the best exposure was made at f5.6 and 1/60 sec. with ASA 64 film, but the exposure meter had indicated f8 as the optimum exposure. To adjust the ASA rating, set the circular dials of the meter for f8, 1/60 sec., and ASA 64. Then, rotate the dial to show f5.6 at 1/60 second. Look at the ASA indicator. It will now show ASA 32, the "adjusted ASA rating" you should use with ASA 64 film. As ASA 32 is one half of 64, your method of adjustment would be to divide any ASA rating used by two to get proper exposures.

photograph by Authors





PRESERVING A RARE BU

Fire! Fire! Grab a bucket or we'll lose the whole town!" The night was April 12, 1883, and the proud old clipper ship *War Hawk* was on fire. She had just made the long voyage up from San Francisco, and had been waiting for a load of lumber at the town of Mill Point, Washington, at the south end of Discovery Bay. Because she was tied up to the dock, if the townspeople hadn't responded fast the whole town might have been destroyed with her. Captain Conner was aboard and tried to save the ship, but the flames had gained too great a foothold. His efforts, along with those of every able-bodied person in the vicinity, were futile. In order not to jeopardize the town further, the captain ordered the 130 foot, 1000 ton vessel cast loose and pushed out into the bay, where she finally sank in 40 feet of water.

The *War Hawk* had been built in 1855, in Newburyport, Massachusetts. One of the great three masted schooners of the clipper era, she had sailed to the far reaches of the world - China, India, around Cape Horn and the Cape of Good Hope. She had been sold into the lumber trade in 1871, and before she sank she was one of the fastest clippers afloat. Now the *War Hawk* was dead.

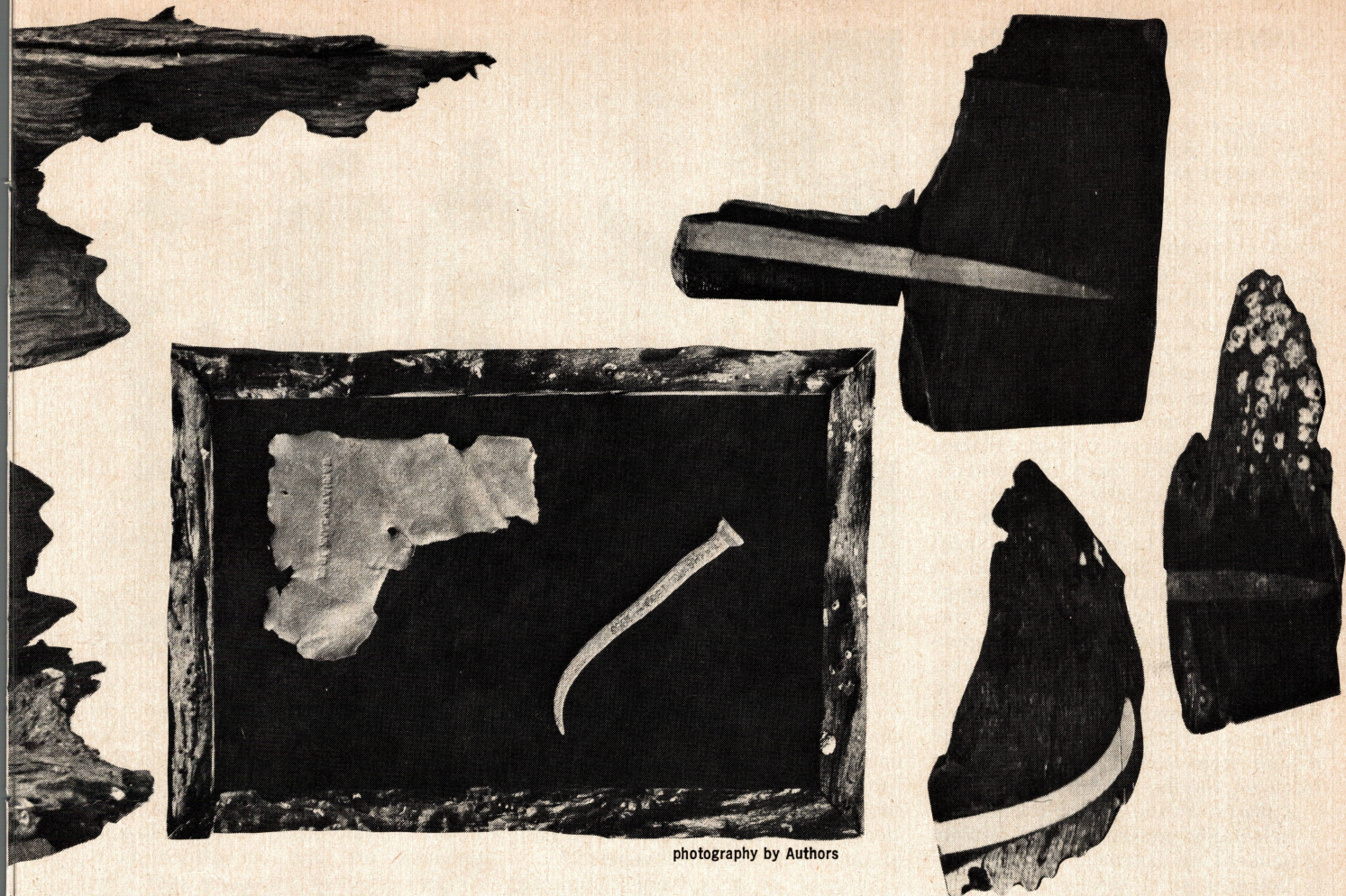
Our first sight of the *War Hawk*, on a night dive almost 100 years later, revealed a ghostly white wall of small anemones that was almost unrecognizable. When we switched on our lights, however, the hull of a mighty wooden ship began to take shape. On initial survey she

seemed to be intact: one complete hull section and part of another were in place. And in the beam of our lights we could see that the *War Hawk*, once a proud ship, was now a host to nature. Many creatures, including octopus, crabs, fish and the inevitable toredos, called her home.

The abundant sea life is wonderful for underwater photographers, but those of us that have been diving on her for the last several years are saddened at the rate of degeneration that has taken place. She is rotting. Nature's creatures that have made her a living reef have taken their toll. We knew that the *Sea Hawk* is one of the last clipper ships in existence, above or below the water, and we were upset at the thought that she might be lost forever.

There is a lot of controversy among the diving community in the Northwest about the rape of our wrecks. Many feel that the ships should be left as they were found for other divers to enjoy as long as they last. The cold waters of the north have contributed to the partial preservation of several of these old clipper wrecks, but our heritage is indeed transient. The day will come when there will be no more wooden wrecks. The old beautiful wood will be gone - destroyed by toredos, battered by storms, or pulled apart by souvenir hunters seeking only brass nails, pins or copper sheathing. Then there will be nothing for anyone, diver or landlubber.

We felt as though there must be a better way — some way of preserving the beauty and character of a past era.



photography by Authors

IT TRANSIENT HERITAGE

By Chuck and Betty Blackstock

So as the planking and copperclad started falling to the sand we started scrounging and recovering what we could. Up came nails, turnbuckles, bits and pieces of wood, to be processed with a method we have used to preserve many artifacts from the ocean floor.

First we wash everything we find as clean as possible with a powerful jet of water to remove some of the small, loosely attached organisms. Then, the brass and copper, if it is not attached to some of the wood, is immediately sandblasted. This removes all crustaceans and what little corrosion there may be. Next the metal is sealed with a clear plastic or acrylic spray. This sealing process may require many coats as corroded metal is quite porous.

We try to recover the wooden portions of sunken ships in the fall and winter only. We place the wood outside, and leave it uncovered for several months so that air and rain may circulate freely on all sides. Because the winters in Washington are so wet, the wood never dries out until most of the salt water is replaced with fresh.

After the wood has been exposed to the air and rain for several months, we clean it with a stiff wire brush and then sandblast it. This is not as drastic as it may seem. The wood is usually still damp, and many pieces are held together with pegs, nails or big brass pins. This dry sand scouring cleans the wood as nothing else can, and also gives us a look at the grain and condition of the wood.

Following the cleaning process, some of the smaller

artifacts are left intact and are sprayed many times with the clear plastic to completely seal the wood. The surface of the larger pieces are sanded and polished to a sheen, and either filled with the clear acrylic spray or rubbed with linseed oil. The linseed oil gives a dull, rich finish to the wood, compared to the glossiness of the spray, but is harder to do and takes longer. The oil finish, however, leaves a more natural look to the wood.

The smaller pieces of the hull or deck planking are usually cut into various lengths for frame material. Then the nails, pins and copperclad are arranged artistically in the antique frame on a soft plush background. These eroded wooden strips are also used to frame prints and photographs of old clipper ships from the sailing era. Some of the pieces are large enough to be used for book-ends or paperweights. The more exceptional ones are displayed individually on tables and shelves.

Coming to our home is like coming to a museum! We have priceless antiques of hand-hewn copper and brass, lignum vitae, dark teak and sturdy oak from an era long since past, and from seafaring vessels long out of existence. Our friends and acquaintances in the diving community have gradually ceased chastising us for taking things off the wrecks. In fact, some have even asked us to make them an artifact! We think that they are as pleased as we are that this heritage of our Pacific Northwest waters will somehow be preserved. >>>

DIVER'S DISTRESS SIGNAL

BY RALPH M. SINGER

A simple plastic whistle - the kind that both policemen and children use - might be the answer for divers in distress. A group of Los Angeles, Calif., divers (L.A. Co. instructors, NAUI instructors and L.A. City Life-guard Diving Teams) tested the whistle against all other popular forms of distress signal and found the whistle to be the most practical, adequate and unmistakable signal there is.

The human voice, they found, is not economical from the standpoint of distance-to-energy output. Flares, rockets and other forms of pyrotechnics could be effective but they are not practical. "The classical arm extended over the head routine is laughable at best," the group found. It takes a tremendous amount of energy to maintain the position, and the current trend toward buoyancy compensators with large oral inflators makes this signal confusing. Prior to descent, the diver normally extends the oral inflator over his head in order to drain the air from it. This move could be mistaken for the distress signal.

A plastic whistle, on the other hand, is universally understood and yet not dependent on language, is sufficiently powerful so it travels a good dis-



tance, and can be assimilated into the diver's equipment without any major changes. The group tested the whistles under a number of conditions — big surf, small surf, offshore winds, on-shore winds, foggy days as well as clear days — and is certain of its ease of operation and effectiveness.

Since those tests were completed,

the Council for National Aquatic Cooperation and the National Surf Life Saving Association have both endorsed the idea and have agreed to discourage the use of whistles around the water for any other purpose. It is hoped that the plastic whistle will gain universal use and acceptance as a simple, effective lifesaving tool.

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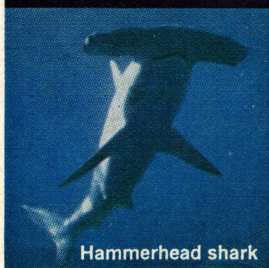
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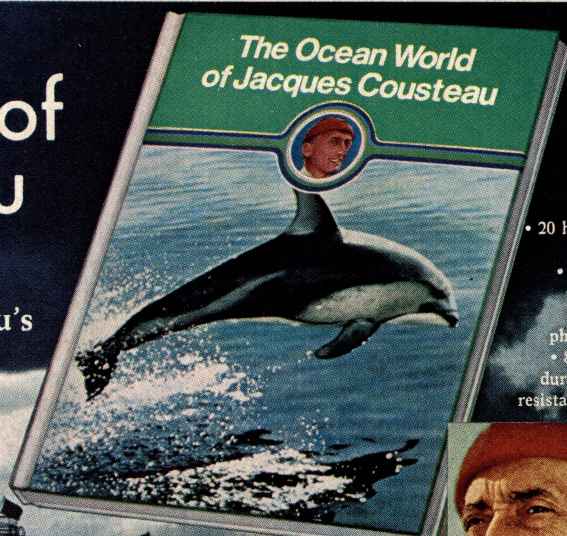
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If the Oceans of Earth should die—it would be the final catastrophe in the story of man and of all life on this planet... maybe fifty years later the last man on earth would take his own last breath. Why imagine such a nightmare about the subject I love most? Because the Ocean *can* die—and we must make sure that he doesn't. Man exists only because Earth is a "water planet"—liquid water being probably as rare in the universe as life, perhaps even synonymous with life. The Ocean *is* life. This is why we must change our attitude toward the Ocean. We must regard him as no longer a mystery, a menace, a dark and sinister abode of secrets and wonders. Instead we want to explore how he moves and breathes, how he experiences dramas and seasons, how he nourishes his hosts of living things, how he harmonizes the physical and biological rhythms of the whole earth, what hurts him and what feeds him—not least of all what are his stories.

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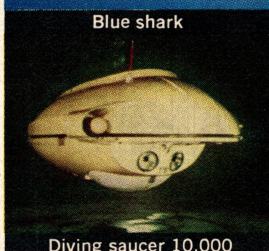
That fish never stop growing—from the moment they're born until they die.



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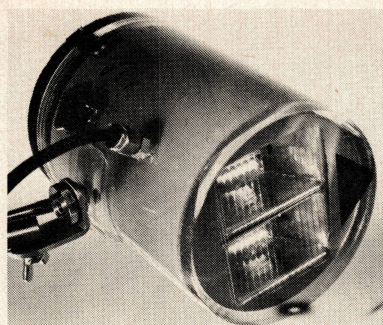
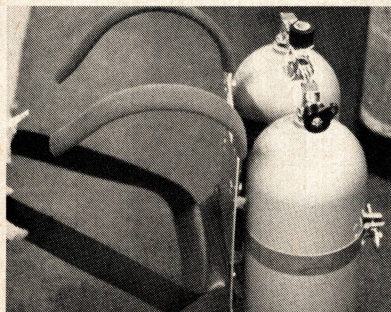
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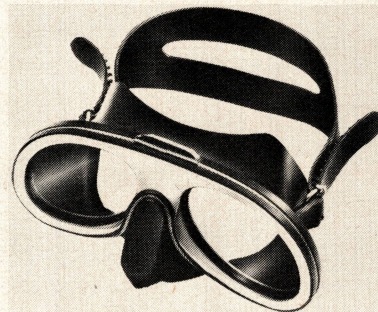
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You can don and doff your tank(s) easily with the new Hooker Back Pack. It features padded, adjustable shoulder hooks to end harness chafing, and a hinged, fabric waist piece that contours to the body so that tanks will not ride up. With a simple adjustment, the Hooker can be used for single or double tanks. \$38. Contact: Pan Western Research, 1506 Dorothy Lane, Newport Beach, Calif. 92660.

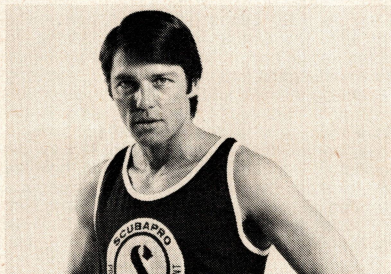


The Seastrobe 120 gives you twin strobe reliability and power. Housed in shockproof PVC the unit can be used to 350 feet. Features 70 degree angle beam, 5800 degree color temperature, 1/1000 sec. flash duration, and 4 sec. recycle time. Guide number full power 98, half power 74 with 64 ASA film. \$210.50 with batteries and cord. Contact: Sea Research & Development, Box 589, Bartow, Florida.

The new Balboa diving mask features the lowest air displacement of any mask in the Swimaster line. Advantages include extended underwater peripheral vision plus positive fitting of a double-edge face skirt. Twin, tempered lens design permits corrective optical work to match individual needs of both diver's eyes. \$18.50. Contact: AMF Swimaster, 3801 South Harbor Boulevard, Santa Ana, California 92704.

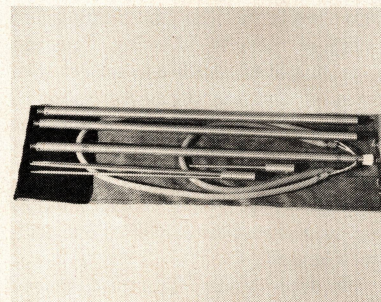


Divers can identify with their sport with the new Scubapro tank top — a new innovation in diving fashion. Designed for sport and casual wear, it is made of the finest quality non-shrinking material. The shirts are dark blue with a large Scubapro emblem on the front, and are available in all standard men's sizes. Priced at \$8. Contact: Scubapro, 3105 East Harcourt Street, Compton, California 90221.

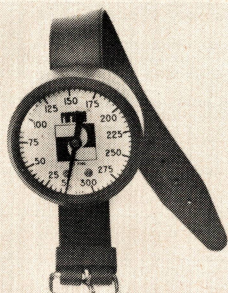


The Garfinger from Sea Suits was designed to end dive suit worries. It has a high collar and Farmer John pants, inserts under the arms and crotch, and tapered side panels. Made of gas-blown Rubatex, with seams double bonded and sewn. Zippers, snaps and twist locks are made of nickel-plated brass. Priced from \$195. Contact: Sea Suits, 825 West 18th Street, Costa Mesa, California 92627.

White Stag is producing a new breakdown aluminum travel spear which extends to seven feet when assembled. The spear has a three pronged paralyzer point, and attachable head for use with spear-points. Each travel spear comes with an attractive vinyl travel case. Retail price is \$25. Contact: White Stag Water Sports, 1046 Princeton Drive, Marina Del Rey, California.

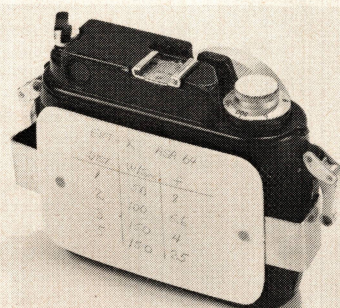


The new Farallon oil filled depth gauge is one of the most accurate gauges available in its price range. Its Bourdon tube movement is completely sealed inside the oil filled case for added accuracy and resistance to shock. The luminescent face reads to 300 feet, with triangular indices at 10, 20, 30 and 40 feet. Retail for \$33.95. Contact: Farallon, 1333 Old County Rd., Belmont, Calif.



Dimension 2 has now made their popular T-shirt line available nationwide. The Diver Designs T-shirts are of premium quality material, printed with many non-fade silk screened designs. These shirts are offered in white at \$4.50 and colors at \$5.00, and provide immediate eye-catching identification with our unique sport. Contact: Dimension 2, 6927 Ridge Manor Ave., San Diego, California 92102.

Water visibility, f-stop, guide number, distance setting, flash distance? It all seemed so clear when you figured it out on the beach, but now you're underwater and can't remember what f-stop to use. Write the info on this Nikonos-tailored camera slate and it will be with you when you need it. Jot additional data underwater. \$3.95. Contact: Aqua-Craft, 5258 Anna St., San Diego, Calif. 92110.



Scubapro is offering a new all-weather jacket for divers. It features a side pocket, shoulder pockets and a large utility pocket in back, with non-corrosive snaps and zippers. Navy blue in color, the jacket is fleece lined, has knitted cuffs and a convertible hood/collar for extra warmth. Available in all standard men's sizes for \$30. Contact: Scubapro, 3105 East Harcourt Street, Compton, Calif. 90221.



New Gear

A new glove from U.S. Divers offers extra mobility and working freedom. Soft and comfortable, the two-sided nylon gloves feature custom individual finger stitching and finishing. For the professional diver who wants good fit, comfort and durability. Priced at \$14.95 for 3/16 inch thickness, or \$13.95 for 1/8 inch thickness. Contact: U.S. Divers Company, 3323 W. Warner Ave., Santa Ana, California 92702.



An Instrument Console has been developed which incorporates three instruments in a single, compact unit. Made of high impact Polypropylene, it is connected to the diver's submersible pressure gauge for ready viewing. Instruments of different manufacturers will fit the console with little or no adaption. Priced at \$15.50. Contact: Underwater Concepts, Inc., 3280 Fort St., Lincoln Park, Michigan 48146.

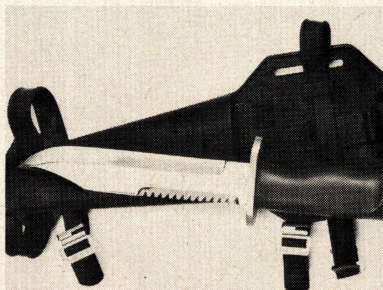
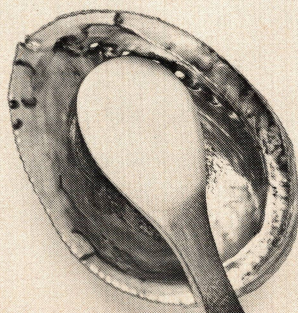


No more hard to adjust knife straps. This elastic, pure neoprene strap — once adjusted to your individual size — stays put at any depth or temperature. The nylon non-slip fittings are always set for your size; strap snaps on and off. Now available in extra long so you can wear your knife on your upper thigh. Retail price \$1.50. Contact: Aqua-Craft, Inc., 5258 Anna Street, San Diego, California 92110.

The deluxe Mariner Kam Pac from U.S. Divers is designed for the professional diver. The low profile design is comfort-contoured with blow-molded polyethylene frame, featuring air and water passage for rapid drainage. A new quick release Kam mechanism allows for instant and easy tank removal. Retail price is \$29.95. Contact: U.S. Divers Co., 3323 West Warner Ave., Santa Ana, California 92702.



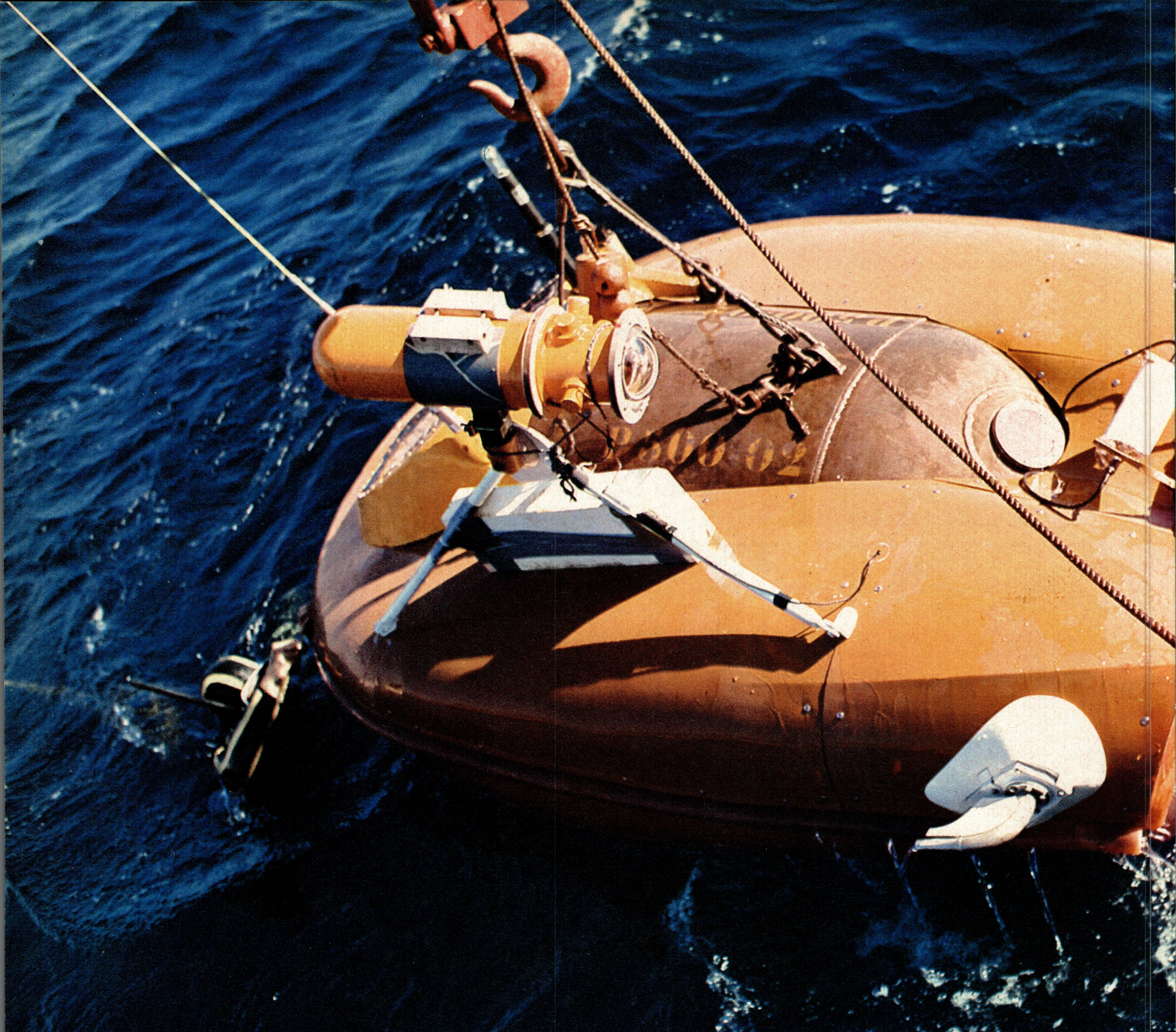
Once you've got your abalone home in one piece, don't ruin the meat and your temper struggling to get it out of its shell. The abalone plucker, perfectly shaped from smooth bamboo, makes cleaning abalone a snap, scoops the flesh out without tearing or cutting. Imported from Japan to do just this job, it is priced at \$1.29. Contact: Aqua-Craft, Incorporated, 5258 Anna Street, San Diego, California 92110.



Handsomely rugged, the new Sea Master Deluxe knife from U.S. Divers features a polished brass blade guard and butt cap, and a rich brown molded rubber handle. The sturdy, seven inch stainless steel blade is serrated at the top for double duty. Comes with a durable sheath that secures tightly to the diver's leg. \$24.95. Contact: U.S. Divers Co., 3323 West Warner Ave., Santa Ana, California 92702.

A remarkable miniature emergency signal that emits a flash visible for 15 miles is now available. The Warn-A-Lite is about the size of a pack of cigarettes and weighs only seven ounces, yet blinks 50 flashes per minute with a brilliance of 1,000,000 peak candle power. Made of rugged plastic, the Warn-A-Lite is shockproof and works underwater. \$24.95. Contact: Warn Ind., 19450 68th Ave., South Kent, Wash.

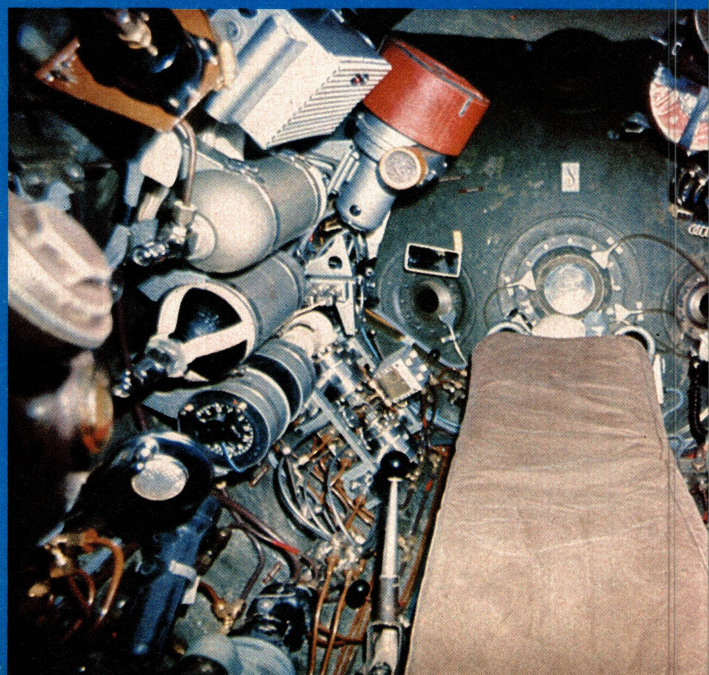




photographs by Author

A Calypsonaut in the water above checks out all systems on a minisub just prior to releasing the tag line which holds it to the mother ship. The photo at right shows an interior view of a minisub with its elaborate array of equipment.

The pilot has complete access to all vehicle controls and readout instruments. The minisubs are used for scientific work beyond the depth and scope of scuba divers, and for filming sequences for Jacques Cousteau's famous TV series.



Saucer Pilot Relives Calypso Adventure
During His

INNERSPACE

Flight Training

By Joseph A. Thompson

The winds screamed down the narrow, winding streets of Marseilles; the first of the seasonal mistrals that roar down from the plains of Lyons chilled the dry, autumn air. I was on my way, with Larry Somers, to meet Andre Laban, director of L'Office Francais Recherches Sous-Marine (now known as C.E.M.A.). Their ship, *Calypso*, rode easily alongside the dock in the harbor, glistening white in the brilliant afternoon sun.

I walked toward the gangway, hardly believing it was happening. Ever since I'd been wreck diving off the New Jersey coast as a boy, I had longed to meet Captain Cousteau. Now, beyond any boyhood dream, my company, Westinghouse Electric Corporation, had sent me to France on an assignment to work with Cousteau aboard the world famous *Calypso*.

Two years before, Westinghouse and Cousteau's OFRS group had begun to build an undersea vehicle designed to take three men 12,000 feet down to

explore the ocean's floor. As work had progressed slowly on this *Deepstar* submersible, Westinghouse had decided to lease the *Diving Saucer* from Cousteau for a submersible expedition along the California coast in 1964. It was to be a substitute operation that would allow the marine scientists to explore to a depth of 1000 feet.

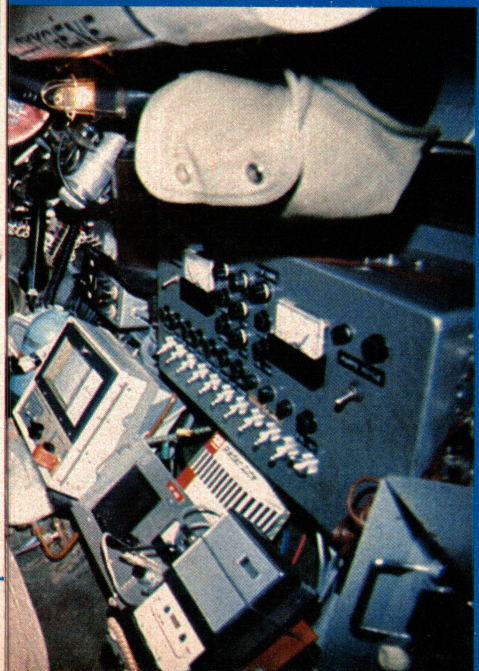
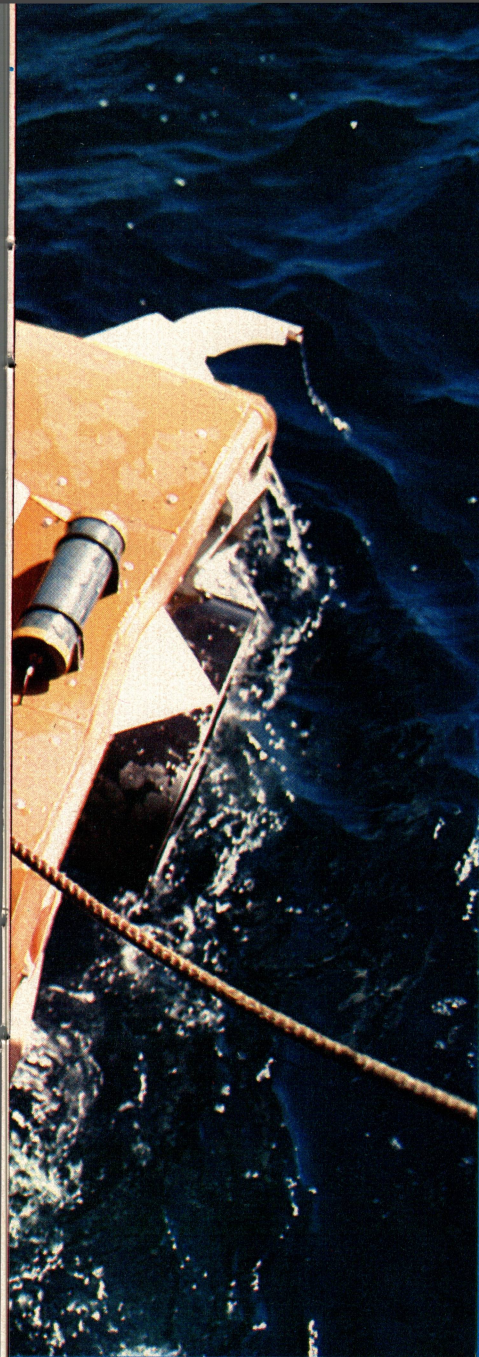
Larry and I had been brushing up on our not-so-good French in preparation for our visit to OFRS. Our assignment was to become fully familiar with the workings and innards of the 10 foot diameter *Saucer* because we would later become its pilots. We also were to make notes on all the maintenance procedures so the Westinghouse operations team could be prepared to support the tiny submersible over a six month lease arrangement with the U.S. Navy and Scripps Institution of Oceanography.

"Welcome aboard," came the greeting from the deck as we walked up the steep gangplank. "We thought you fellows would never get here," said Cousteau as he offered his hand. We apologized for the inevitable delays in flight, our awkwardness in new surroundings, and our bad French. The warmth that radiated from this slender, vibrant man put us at ease.

Looking about the ship as I followed Captain Cousteau through passageways, I noticed a well worn appearance that comes with age. *Calypso* started life as a YMS—a yard mine sweeper—in Seattle, Washington, in 1942. From there she was delivered to England for the Royal Navy. Cousteau found her after the war in Malta and had her converted to a research ship. Now, after 15 years of oceanographic exploration, *Calypso* had mellowed like good wine. It had the appearance of a cheery home which I appreciated more each time I returned.



courtesy Cousteau/Wolper Productions



Back on land Larry and I spent a full week in the tutelage of Andre Laban and others of the small group in the crowded, dusty offices at OFRS while we learned all about the *Diving Saucer*, or *Soucoupe* as it was better known to the French crew. We spent hours going over systems and wiring diagrams. Our instructor for most of the *Soucoupe* was Jacques Roux, who long before had earned the name of "Gaston" from the comic "Alphone/Gaston" routine. Gaston had been the mechanical mastermind of the *Soucoupe* in 1958-59. He wanted to be sure we understood everything, even though he was coming along with the *Saucer* when it came to California the following month. His English was halting but precise; his knowledge of the *Saucer* was encyclopedic.

Besides learning all the systems which would enable me to pilot the *Saucer*, I also spent a great deal of time with the cameras and lighting. Gaston showed me with great pride how to operate the 35mm camera built especially for *Soucoupe* by Prof. Harold Edgerton of MIT, dubbed "Papa Flash" by the Frenchmen. It was the only one of its kind ever made, and required the gentle handling that Gaston had long given it.

Our two weeks of learning passed quickly. We would now take *Soucoupe* for a 10 day cruise to Port Vendre where several of the marine geologists would be diving. *Soucoupe* was placed aboard *Calypso* inside the large afterhold adjacent to the stern compartment. As soon as the scientists were aboard, Captain Maritino gave the word to one of the deck crew to single up. Shortly after midnight, we slipped our lines and made our way out of the harbor.

The next day Larry and I began our intensified observations. Albert Falco, Chief Pilot for OFRS and one of Cousteau's most experienced men, shared the job of piloting with Andre Laban. We stayed as close to them as possible, watching their every move. Larry took special note of all the details of launching, which involved the use of the jumbo articulated crane mounted on the fantail of *Calypso*. We witnessed about 10 dives in this two week period.

One day, the *Saucer* had a few problems in servicing. *Calypso* had been working along the French coast. Larry and I were helping out and learning all the while. Finally the *Saucer* was launched during the middle of the afternoon. The crew did not track the *Saucer* as nicely as we learned to do later and there was no

U/W telephone for communication.

The custom was that after about four hours the *Saucer* would surface, and using the CB radio, would call the small boat to come and aid *Calypso* in the retrieval. This afternoon the sun had dropped suddenly behind a cloud bank at about the time we expected the *Soucoupe*. The horizon blended into the gray sea making visibility difficult; a slight mist rode on the water. No radio call came. Everybody was topside on the bridge or up the mast looking in every direction. Nothing. Gaston viewed the scene with customary calm. "How did this ever happen?" I asked Gaston. "No problem," he said, without emotion. "No problem—probably battery on CB is dead."

It was rapidly growing dark. What would happen if we didn't spot them before dark, I wondered. I could just imagine myself bobbing about in that tiny capsule all night wondering if there were any ships cruising close by.

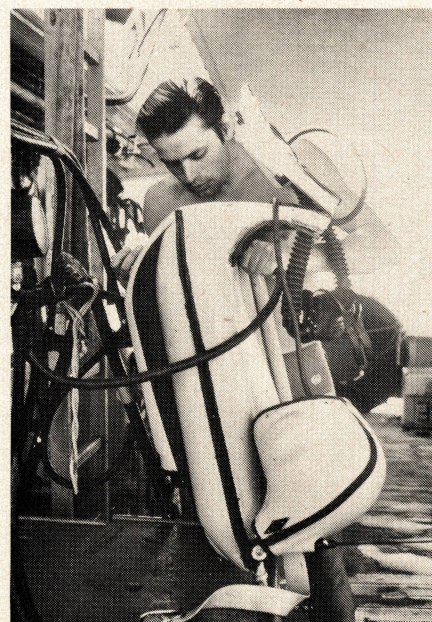
"Over there!" came a shout from Bernard Dellemonde, one of the crew, who was gesturing into the grayness. I couldn't see a thing, but immediately the outboard launch headed in that direction. As *Calypso* drew nearer, I could at last see a faint stream of water rising 15 feet in the air from the upturned water jets of *Soucoupe*. The French crew was quite unperturbed, even though the *Soucoupe* had been sitting for an hour on the surface. Gaston had been right—the CB radio battery was dead.

Our visit in Marseilles ended shortly after, and we returned to the U.S., but I knew I would be seeing *Calypso* again. During the following six months I got to know the members of Cousteau's group better as I worked closely with them on the *Diving Saucer* project in California. Nearly four years went by before I did see *Calypso* again. In the meanwhile I had learned to pilot the *Saucer*, under the able guidance of Andre Laban. Following the *Saucer* project in California, Westinghouse launched *Deepstar 4000*. I was the first American to pilot her and spent several years diving with scientists from the U.S. Navy Electronics laboratory (now the Naval Undersea Center).

Time passed and I left Westinghouse to become chief pilot for *Beaver IV*, North American Rockwell's four-man sub. It was the first and last venture for North American into a small field that was even then crowded. In 1969, Captain Cousteau invited me to come to Catalina Island where he had been trying out his

new minisubs and other wet swimmer vehicles. He and his very capable designers at Marseilles had built two very small one-man vehicles whose primary function was to carry 16mm and 35mm movie cameras to as deep as 3000 feet.

I was delighted to have the opportunity to pilot one of these new vehicles, having flown both the *Diving Saucer* and *Deepstar*. As our seaplane circled over the Isthmus Harbor, I could see *Calypso's* familiar shape gracing the harbor below. Once aboard I saw that little had changed; a few of the old crew members I remembered from Marseilles had joined Captain Cousteau. Andre was aboard and quickly proceeded to familiarize me with the *Puce de Mer*, certainly a more euphonious name in French



Special *Calypso* back packs contain tanks, regulator and radio equipment.

than its English equivalent, *Sea Flea*.

After about an hour's skill session with Gaston one evening, Captain Cousteau walked over to me and said, "Joe, are you ready?"

"Ready for what?" I asked.

"Ready for your dive in the minisub tonight," he replied. It was ten o'clock at night. *Calypso* was just inside Cat Harbor, located on the northwest side of the island. After only an hour's instruction, I was a little apprehensive about diving a new vehicle in the dark. But I wasn't about to say so. I would be the first American in the minisub.

"You bet I'm ready," I said.

As I climbed into *Minisub #1*, the control layout, the position of all

of the switches, and all the things Captain Cousteau had cautioned about came back to me. It was completely dark inside but I felt right at home immediately. I gave the O.K. high-sign out the port and an "all ready" on the radio. The crane on *Calypso* gently swung me and the *Sea Flea* over the stern into more blackness. Gaston informed me on the telephone that the diver had unhooked the crane line. I had been released and hardly noticed it.

I switched on the bright cinema lamp and pitched the mercury forward. We had been in 150 feet of water so I knew I would see bottom soon. At about 30 feet from the bottom I dropped the descent weight giving the vehicle nearly neutral buoyancy. The sandy ocean floor came



Captain Cousteau explains how minisubs handle in deep water to author.

sharply into focus, illuminated by the 1500 watt lights mounted outside the minisub. It was gliding slowly and easily to the bottom.

I felt pleased that all had gone well. It was the first time I had ever been in a one-man vehicle, and I didn't feel alone at all. For about 20 minutes I watched some of the night foraging creatures. I could see about seven or eight halibut or flat fish feeding in the bottom and slowly undulating along. While I was shooting some movie footage, another light came gradually up alongside. It was Andre, in *Minisub #2*, coming to see how I was doing on my training dive. A few jellyfish drifted by. I had hoped I would see some horn

sharks which I knew foraged at night. But since the bottom was sandy with no rocks, we saw none.

After about 45 minutes the water pump which drove the jets suddenly stopped. I was unable to maneuver. My only choice was to end the dive and surface. As with all of Cousteau's submersibles, the ability to surface was independent of propulsion and electrical power. By dropping another weight, I rose quickly to the surface. To my disappointment, my first minisub dive was over.

My next dive didn't come until late in the same year when I was again invited to join *Calypso* to work with the minisubs. I met Andre Laban and several others at Los Angeles Airport where replacement parts for one of the gyrocompasses were being loaded aboard the twin Beechcraft. We were bound for Cabo San Lucas on the southern tip of Baja California—that wonderful, remote area in Mexico where remarkable water visibility prevails, and steep undersea canyons at 1000 feet and deeper reach to within several hundred feet of shore.

The object of these dives, which were to last over the next three weeks or so, was to explore the deeper parts of the submarine canyons that run the length of the harbor from the fish cannery to the last island on the tip. We knew from previous *Saucer* and *Deepstar* dives that there were many geological and biological features concentrated in these several miles. We hoped to film the animal life inside these steep walled gorges.

Dive Number 54 for *Minisub #1* began at 8:30 p.m. as the boat and I were lowered three times for the cinema photographers to get plenty of footage. I grew accustomed to this routine which we ran through for several takes to make sure there was a good shot for the film editors. On the third lowering I was released. The sub and I settled slowly to 60 feet where I joined Andre in *Minisub #2*. I could hear his voice crackle over the underwater telephone. "Joe, look at all the stingrays. It is a good subject for cinema."

I worked in at an angle to Andre hoping the lighting from my vehicle would side-light his filming. Now I could see a little of Andre's face through the port. The bottom was very nearly covered with stingrays that were about three to six inches wide. Among the rays were several shovel-nosed sharks. I couldn't recall having seen such an assemblage of animals before. But then I had never made a night dive in Cabo San Lucas.

We spent several hours photographing and I practiced flying the vehicle just off the bottom. Finally Andre exhausted his battery power and surfaced. I followed shortly after, having ducked in around a series of rock outcrops down to about 1200 feet.

During the following ten days, the two minisubs made over ten dives together. The other pilots for these were Andre and Captain Cousteau, taking turns on a rotation basis. The dives I made were exciting. On several, I had propulsion problems where a hose broke or I lost partial control. But the one dive that stands out from the rest came on Christmas Eve.

We were at Isle de San Benedicto, a huge rock of multi-colored lavas—reds, browns, orange, and green. The fish surrounding the island were far more varied and abundant than those near San Lucas. From our echo sounder survey we had located several pronounced submarine canyons, those steep valleys running down the slopes that are fascinating to explore.

Captain Cousteau began the dive in *Minisub #2*, descending close to *Calypso's* anchor cable. I was to follow him in the other sub. As with the previous dives, this was in darkness since we hoped to photograph the seldom seen nocturnal forms of life. Christmas Eve, I thought to myself, was certainly a rare time to be night diving in a submarine canyon. I thought of my friends at home gathered about the proverbial hearth, involved in traditional Christmas festivities. Little did they suspect that I was being buttoned up inside this strange craft on my way to dive with Captain Cousteau. Few people could top that for adventure!

Moments before my launch, the bridge received a message from Cousteau on the underwater telephone that he had become entangled in the *Calypso* anchor cable. I was launched with a shackle attached to the cable that was held by the minisub mechanical arm or manipulator. In this way my sub could slide down the cable, releasing the shackle, and land near the other sub. When I reached the bottom at about 360 feet, Captain Cousteau in *Minisub #2* wasn't there.

I turned my small observation platform slowly around looking out into the darkness. After what seemed like more than a few minutes, I saw a dim light several hundred feet away and started in that direction. I called on the phone. "Over here, Joe," came the clear reply. "No problem now. I worked my way out of the cable."

(Continued on Page 62)

Ocean Gallery

SQUID

By Jack McKenney

"...The tiger can only devour you; the devil-fish, horrible, sucks your life blood away. He draws you to him, and into himself; while bound down, glued to the ground, powerless, you feel yourself gradually emptied into this horrible pouch, which is the monster itself."

And so, the giant octopus was described by Victor Hugo in his classic book, *Toilers of the Sea*. Perhaps Hugo would have been more accurate had he attributed that description to the giant squid *Architeuthis princeps*, which resides in the deepest ocean depths and supposedly attains lengths of 50 feet or more. Only the leviathan whales, who feed on these "terrible monsters" and who bear battle scars from these deep feeding forays, have come in contact with them underwater.

Chances of a diver ever encountering one of these giant creatures are highly unlikely. However, divers often sight and even play with the smaller timid versions measuring up to ten inches long. While diving at Conception Island in the Bahamas one night, Dave Woodward caught a tiny squid, *Loligo peali*, the American squid, in his hands. With a bright light shining on the little creature, the squid twinkled all over like a Christmas tree. It took on stripes and blotches of effervescent colors and seemed to radiate like a living multifaceted jewel.

Like all cephalopods, squid are able to change colors depending on their mood. This is accomplished by the blue, green, brown, red and yellow pigment sacs that are located just under the skin of the squid. The

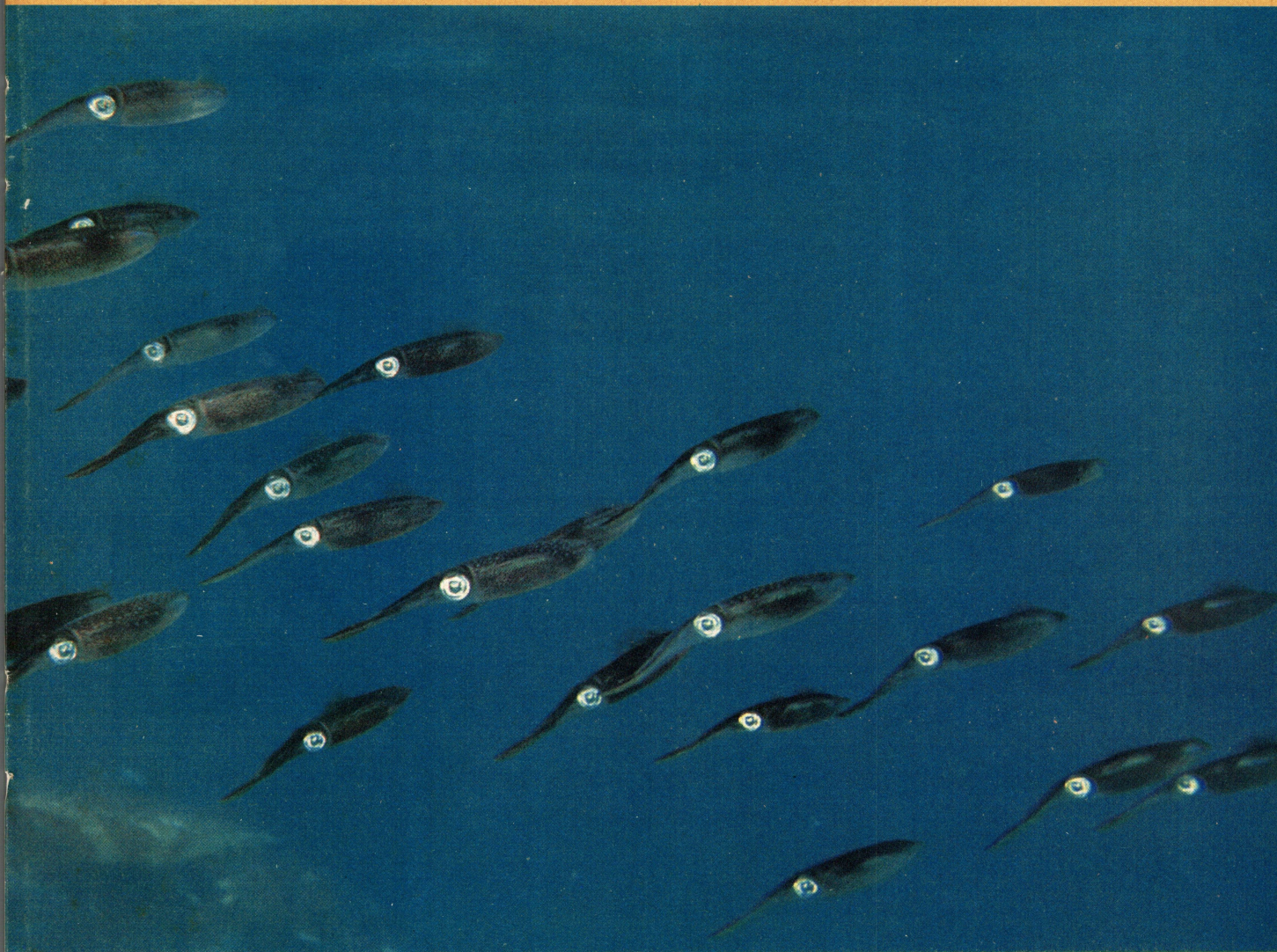
sacs are surrounded by radiating muscle fibres, which are controlled by the nervous system. When the squid becomes excited and the muscle fibres contract, the little bags of pigment are stretched into flat, one-sixteenth inch in diameter discs just under the skin. When the mood of the squid changes and he relaxes, the pigment sacs round out and become microscopically small.

Squid have very complex eyes which compare favorably with man's in visual acuity; and like most cephalopods, squid can eject a dark "inky" liquid to confuse predators in the hopes of making a getaway. Unlike the octopus, which has eight arms, the carnivorous squid has ten arms (he's called a decapod). Squid will dart through schools of fish seizing their victims with these two "additional" arms, which are longer.

For long range cruising, fish like tuna and jacks are surely the most efficiently equipped creatures in the sea because of their shape and tail design. Other creatures like jellyfish, bivalves, salpa and cephalopods can travel by jet action, not as efficient over long traveling distances, but quite suitable for quick bursts of speed for short distances. When a squid contracts its mantle a narrow stream of high pressure water is forced out through a flexible siphon. Maneuverability is excellent because the siphon can be pointed in any direction. (It's interesting to note that jet boats work on a similar principle, and are much more maneuverable than craft that are powered by a propeller.)

In addition to their jetting capabilities, squid also have a pair of





photograph by E. T. Rulison, Jr.



photograph by David Doubilet

horizontal muscular fins, one on each side near the posterior end of the body, which can be controlled to undulate in both forward and backward directions. The fins are almost transparent and appear as rippling waves when in use.

Squid can be found in most oceans of the world and are especially abundant during mating season off southern California. The *Loligo* squid, off the southern California coast, live in small groups for two or three years and then gather in vast numbers for a mating orgy which lasts three to four days. Captain Cousteau's *Calypso* team has estimated as many as a billion squid in a volume only 400 feet in diameter and 100 feet deep.

The most advanced creatures on the scale of evolution are those that reproduce by copulation — the male of the species fertilizes the eggs with-

in the female's body. The female squid attracts her mate by flashing bits of captured luminescence. She has a special nidamental gland in which she grows and nurtures the luminescent bacteria. Squids mate by having the male firmly grasp the female in his tentacles and, with the lowest arm on the left side, deposit sperm into the female's oviduct.

When it comes to looking after her offspring, Mrs. Squid is not quite as responsible as Mrs. Octopus. Mother octopus jealously guards and looks after her eggs, while mother squid simply dies after she lays her masses of cigar shaped, jelly-like eggs, called "dead man's fingers," on the bottom. It is estimated that probably no more than one percent of all eggs laid by squid ever reach maturity. It's a good thing, too, or else we'd all be up to our first stages in squid. »

News Briefs

By Hillary Hauser

CADIZ BAN

As a result of the Atlantis scuffle (NB, Nov. '73, Jan. '74, Feb. '74), diving has been banned, hopefully only temporarily, along the Cadiz province coastline in Spain. Spanish authorities took a dim view of the Atlantis group's activities, which allegedly included selling artifacts to a local museum director. Spanish law requires all non-marine items extracted from the sea to be turned over to the Guardia Civil or other authorities.

According to Roy Shepard, President of the ROTA Aquanauts dive club in Rota, Spain, no one knew how long the dive ban would be in effect, but in January the matter was before Cadiz officials for consideration. Spearfishing had been authorized but only with special permission and when participating in sanctioned competitions. One possible reason for the ban was a rumor that the Atlantis search group had returned to operate from a base in Morocco.

DREDGERS FIND WRECK

A merchant vessel dating from 1520 or even earlier has been discovered off Plymouth, England, during dredging operations conducted by the British Dept. of the Environment. According to the British Sub Aqua Club, the dredger recovered two breech-loading cannons and a piece of sodden timber. Experts dated the wreck by the shape of the keelson.

The ship is believed to have been 600-700 tons, about 120 feet long, and built at a time when ship building was undergoing a

revolutionary change. It's possible that the wreck may possess features that have been unknown until now. Erin McKee, who is leading the salvage team, said that once his divers have found the stem and stern, positive identification will be possible. It is suspected that the find may be as important to British maritime historians as that of the *Mary Rose*.

SEA LINK REPORT

At the beginning of this year a panel of experts studying the *Sea Link* tragedy (SDM Nov. 1973) made their official recommendations public. According to Ocean Science News, recommendations made by the panel were that an "acceptable level of risk" be established before any manned submersible operation be un-

dertaken, and that future projects be reviewed to determine whether or not they are worth the risks. The sub itself was to be reexamined for all possible snags, a review of life support was to be made, and safety devices were to be checked.

The panel also recommended the appointment of an operations director, "fully responsible for planning, safety and conduct of field operations . . . independent of the engineering and development side of the program."

E. COAST FIND

For years divers have known of a large steel wreck lying in an area called the "Mud Hole," 195 feet down, nine miles off Long Branch, New Jersey. On Dec. 15, 1973, divers from the Eastern Divers Assoc. made positive identification of the wreck by recovering the entire helm stand from the bridge of the ship. The name of the shipyard was discovered on the recovered items, and communication with the builders revealed that the ship was the *I. P. Goulandris*, a 3750-ton Greek freighter missing since Dec. 1, 1942. The *Goulandris* sank as a result of a collision with another ship.



Cameron Mitchell (left) and Tzimoulis (right) plan a dive to a wreck in Truk Lagoon. (Photo by S. Ransom)

CAMERON MITCHELL STARS IN UNDERWATER ADVENTURE

ABC-TV's "American Sportsman" recently featured a half-hour segment in which veteran television and motion picture star Cameron Mitchell ("High Chaparral") dived on various wrecks in Truk Lagoon. Also featured was SDM publisher Paul Tzimoulis, who accompanied Mitchell during the subsea explorations. The adventure was directed by Scott Ransom, who has made three other U/W segments for "American Sportsman," and filmed by Al Giddings, Sea Films, Inc.

Exploration and adventure were the key themes of the Truk caper, which aired February 17 across the nation. Mitchell and Tzimoulis dived on the Japanese freighter known as the "Bow Gun Wreck," and explored the Zero fighters and cargo of ammunition on the *Fujikawa Maru*. The divers also made an exciting investigation of the sunken submarine tender *Rio de Janeiro Maru*, and made several dives on the newly discovered wreck *Amagisan Maru*, a freighter with a cargo of aviation fuel, automobiles and ammunition.



Divers Tom Roach, Bob Archambaut, Gary Gentile, Bill Hoodiman and charter boat capt. George Hoffman, after recovering the helm.

GIDDINGS/HASS FILMS SET FOR TV

Al Giddings, president of Sea Films, Inc., recently announced that he and the world famous undersea pioneer Dr. Hans Hass of Vienna have completed two one-hour T.V. programs for viewing in Germany, Austria and Switzerland. The first program follows the thoughts of Dr. Hass about conservation in relation to spearfishing. The second program is a one-hour version of the completed *Silent Warrior* filmed in Truk Lagoon during the discovery of the famous Japanese submarine I-169. Both programs are to appear in the U.S. later this year.

BRITISH BEEF

British divers are clamoring for £1000 a week in the North Sea - which is what they claim American divers are getting for the same type of work in the same area. The £100 per week wages the English divers are getting was referred to as "pocket money" and "peanuts" by comparison. Meanwhile, Britain's offshore industry may boost the need for working divers (below 150 feet) from the present 200 to 500 by 1980.

CLEVER CLEAN-UP

There are clean-ups and there are clean-ups, but one group of Canadian divers took such a different approach to their ecological dive project that it's well worth mentioning. Last summer, nine divers, students of the Cariboo College in Kamloops, got together and decided that instead of working at \$2-\$4 per hour summer jobs they'd initiate a full scale clean-up campaign. Calling themselves "Underwater Beach Clean-up," they applied for an Opportunities for Youth (OFY) Grant, which gave each of them a minimal wage of \$90 per week. With this grant they worked

for themselves to clean up the bottom of various lakes and rivers in British Columbia. According to Randolph Kashino, the total amount

received from the government — \$13,000 — paid each of the nine divers their salaries, paid for air, transportation and equipment.



George F. Bass, president (left), and Michael L. Katsev, vice president, of AINA, examine pottery from the Kyrenia Shipwreck, Cyprus. (Photo by Susan Katsev)

ARCHAEOLOGICAL INSTITUTE FORMED

George Bass, well-known underwater archaeologist formerly associated with the U. of Pennsylvania, is now headquartered in Cyprus, where he is devoting his full attention to the underwater surveying of ancient wrecks with the American Institute of Nautical Archaeology.

AINA is something new for U/W archaeology buffs, or for serious students who would like to study the subject in depth. The Institute, formed last year, will offer summer courses on nautical history and archaeology. Candidates will be selected graduate students of archaeology (and occasionally marine engineering) from contributing institutions of AINA. First contributing institutions are Bryn Mawr College, U. of No. Carolina, U. of New Hampshire, U. of Cincinnati, and UC Berkeley. Interested students should write: Professor G. Kenneth Sams, Dept. of Classics, 103 Murphey Hall, University of No. Carolina, Chapel Hill, N.C. 27514.

Besides Bass, the AINA staff also includes Michael L. Katsev (vice president of AINA—also headquartered in Cyprus), David I. Owen, and many other notable educators in the archaeology field. Bass, Katsev and Owen have, since 1960, excavated five ancient shipwrecks in the Mediterranean. Methods, techniques, and specialized equipment designed for working in the sea were developed by the staff of the Institute and have since been adopted by other underwater groups. In late summer, 1973, the Institute conducted an U/W survey off Turkey, sponsored by the National Geographic Society. This year AINA will excavate one of the shipwrecks found during the survey.

AINA is presently conducting a membership drive. Members will receive, among other benefits, the AINA newsletter which will describe the institute's work, latest developments, and newest archaeological discoveries. For information, write: Cynthia J. Eiseman, Exec. Director, Box 261, Philadelphia, Pa. 19105.

BOUNTY RELIC

A small cannon has been raised from the wreck of the *HMS Bounty* by descendants of mutineers who burned the ship in 1780. The ship's stern anchor was recovered in 1957, while the rudder and another anchor were raised in the 1930's. These are the only relics ever recovered from the *Bounty*. Presumably everything else is still in the ocean near Pitcairn Island. Steve Christian, a descendant of First Mate Fletcher Christian, leader of the mutiny, hopes to raise other relics soon. (Submitted by Ellsworth Boyd.)

ODDS & ENDS...

Aquarius Descends is the name of a new book by Dr. Joseph MacInnis, president of Undersea Research Ltd., Toronto. The book will be published this year by McClelland & Stewart . . . At the end of last year a successful weld was made at 540 feet in open sea off Louisiana. The welding of two sections of 32 inch pipe was done 200 feet deeper than any previous weld (good news for the North Sea oil industry) . . . A Maine lobster fishing industry (Prelude Corp.) is quitting business; they say there are simply no lobsters to catch . . . Mote Marine Lab will get a new facility at Placida, with construction to begin sometime in mid-1974 . . . A shellfish quarantine was in effect in Calif.'s Humboldt Bay last Jan. due to a million-gallon-a-day sewer spill . . . \$165,000 worth of diving equipment and a \$180,000 concrete pier has been dedicated by Highline Community College (Wash.) for its two year Diving Technician Program. Funds came largely through Sea Grant . . . Sponge diving may be dying out in Greece; higher living standards, improvement of artificial sponges and territorial water disputes with Libya are reasons.

Deadly Cocktail

How safe are fish collecting drugs?

By Bill Barada

In "Bring 'Em Back Alive," SKIN DIVER, March, 1971, I wrote that the use of chemicals for fish collecting is not only against the law but that knowledgeable wholesalers refuse to buy drug-collected fish because they have a higher mortality rate than those taken without them. That statement ran head-on into a controversy that has been raging among fish collectors, skin divers, wholesalers and aquarists for years.

The result was a barrage of angry letters and phone calls defending the use of quinaldine for "juicing" fish, as it is called in the trade. I was told: Everybody juices fish, whether they admit it or not . . . There is no law in Florida against the use of chemicals to catch fish . . . Quinaldine is a tranquilizer and it doesn't hurt the fish. It just puts them to sleep . . . If we quit using chemicals the saltwater aquarium business would fold and scientific institutions would be in big trouble. Every wholesaler in the business buys quinaldine-juiced fish.

My critics were correct in stating that Florida law did not prohibit the use of chemicals for fish collecting. Many states have stringent regulations on the practice, but until recently in Florida, juicing remained a moral question strictly up to the individual. Word spread rapidly that quinaldine was "safe" and its use became commonplace among both amateurs and professionals.

The most convincing statement came from Barbara Jane Palko, fishery biologist, U.S. Department of Commerce, Miami, Florida, in a letter published in the July 1971 issue of SKIN DIVER. She stated, "Not all 'chemicals' cause higher mortalities nor is their use unlawful in the state of Florida. Wholesalers do purchase fish collected with drugs regularly and without damage to either the fish or the wholesaler's reputation.

" . . . The mortality of fish collected with quinaldine decreases as the fish is anesthetized almost immediately and is not subject to the traumatic shock of a 5 to 30 minute pursuit . . . These 'drugged' fish also transport more readily with fewer losses than do fish collected without quinaldine. When used properly by an informed person there is no danger or damage."

Other letters to me agreed with my statement just as violently. Robert Straughan, founder of the magazine Salt Water Aquarium, with over 30 years experience as a professional collector and wholesaler, said, "You can get all the fish you need without drugs. Any collector who must rely on drugs to catch fish should get out of the business."

Straughan also said when he inadvertently bought fish from a collector who used drugs he had a high percentage of loss. He states that he has seen dead fish lying all over the bottom in holding tanks of wholesalers who bought chemically-collected fish.

Bob Brown, owner of Marine Specimens Unlimited, told me that quinaldine is all right if the collector knows how to use it, but it has a delayed reaction on fish which sometimes die weeks after they are caught. By that time the fish have usually been shipped and he has an angry customer on his hands.

The controversy continued to simmer quietly beneath the surface until 1973, when legislation, supported by the Florida Skin Diver's Association, the Florida Wildlife Federation and the Department of Natural Resources, brought the conflict boiling into the open. The bill which finally passed simply prohibits the use of chemicals in the capture of marine species unless the person obtains a permit from the Division of Marine Resources. Clifford A. Willis, spokesman for the department, stated the only purpose of the permit is to let the state learn how much and what kind of chemicals are being used and for what purposes. No permits will be denied, nobody will be put out of business and no action will be taken until studies are completed by department scientists.

The reaction to the bill was a flood of claims and counterclaims by opponents and proponents of drug-collecting, which further confused the issue. As a result, SKIN DIVER asked me to dig into the problem and try to untangle fact from fiction.

My most important discovery is that quinaldine is *not* safe. It is highly toxic to fish, animals and people. Containers from manufacturers carry the following label: CAUTION — VAPOR HARMFUL — AVOID PROLONGED OR REPEATED BREATHING — AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. The chemical is manufactured for use as a binding agent for dyes, was never intended for use as an anesthetic, especially for fish, and it has never been tested or approved for direct application into the environment.

A chemist for one of the major manufacturers said that quinaldine affects mucous membranes such as those in the eyes, nose, throat and wet areas of the skin. He said that every diver who has handled the stuff in full strength has probably been burned at least once.

David L. Curtis, a behavioral scientist, marine aquarist and diver-collector, in a letter in SKIN DIVER, January 1973, states that he is dismayed by people who, "under the guise of authority and professionalism . . . would instigate a pillage of the sea through the use of drugs . . . This form of collecting . . . is the major cause of the unsuccessful results of the serious marine aquarist. As it is impossible to control drug dosage through such administration, it is also impossible for certain specimens not to be dealt irreversible damage. This damage is to the gill and respiratory system, the overall membrane and osmotic equilibrium of the fish, and almost invari-



ably causes (in the smallest doses) irreversible liver damage. Such a specimen will often show no symptoms or signs of distress for a period of about three weeks, at which time the fish dies for no apparent reason."

I will grant that aquarium fish can die from a thousand different causes, such as disease, contaminated tanks, contaminated water and the introduction of pollutants in fresh water used to create synthetic sea water. Even a fish autopsy may not determine the exact cause of death. Consequently, it would be very difficult for a hobbyist to "prove" that a mortality of fish he bought was due to drug-collecting.

Some scientists, however, believe that quinaldine affects the nervous system of fish. John Stormont, a biologist-photographer with Underseas Media, a company which makes scientific film strips about marine life for educational institutions, says you can't keep medicated fish in a tank with invertebrates such as urchins, worms, shrimp and anemones. Drugs used to prevent disease affect the nervous system and are fatal to invertebrates.

Barbara Jane Palko, and other scientists who defend the use of drugs, counter this with evidence that drug-collected fish (with the "proper" formula and procedures) live long lives in captivity and that some species have even successfully spawned and produced healthy offspring. Palko believes that the first break-through in fish aquiculture that will show a profit may be in marine tropicals for aquariums.

When asked to define "proper use," she said that many collectors use the wrong proportions. She has developed a basic formula which is a standard solution. On certain species of fish, however, this strength must be cut by one half or three quarters. Thus, she said, it becomes a question of deciding which species of fish you are after as you must prepare that strength in advance. She also said that weaker solutions are more effective in clear water (probably because sediments absorb some of the drugs before they hit the fish).

Even when used at proper strength, on the proper

species, the fish must be put in water with an open flow system, such as a bait well, for at least a half hour after it is drugged. She says that if you put a drugged fish in a bucket it will probably die from residual effects.

The method of using drugs is also very important. She said they are a collector's aid, used only to drive a fish out of a hole and to slow its reflexes to make it easier to catch. Palko becomes irate in describing the practices of some divers. "I've seen people on a reef dump a whole gallon of the stuff just to get one fish. They knock out a bunch of others they don't want and just leave them to be eaten or die." She says when you juice into a hole or a crevice with quinaldine you should take everything that comes out or is affected. Otherwise, those you don't revive will probably die. This is especially true where water is not circulating.

Palko did not explain how different strength formulas for different species are applied when a number of species of fish are in the same hole. Also, she didn't say what happens to other organisms such as shrimp, crabs, lobsters and similar invertebrates, which may be hit by the drugs and remain inside a crevice, out of sight and out of reach. When asked what effect these chemicals have on marine organisms other than fish, she answered, "I don't know. That's out of my line." She knew of no studies that had been made on this subject.

Palko was unwilling to release her chemical formula for publication, but the most common solvent used with quinaldine is acetone which is also toxic and is known to have a devastating effect on corals. Bob Straughan calls acetone a poison which is deadly to fish as well as corals. The damage to corals has been documented by tests in closed systems.

Dr. Henry Feddern, who was successful in getting several species of tropical fish to breed in captivity while he was doing aquiculture research for the Precision Valve Corporation, uses quinaldine in collecting specimens, but Dr. Feddern uses alcohol instead of acetone as a solvent. He gave his formula as: 5 mls. quinaldine,



photograph by Author

Barbara Jane Palko believes drug-collected fish (caught with proper formula and procedures) live long lives in captivity and that some species have even successfully spawned and produced healthy offspring.



photograph by Jeff Meyer

(99% pure) into 250 mls. vodka (ethyl alcohol, 80 proof — not other alcohols which are poisons). Immediately before use, he mixes one part of this solution to four parts of sea water in a plastic squeeze bottle. This gives a quinaldine-saturated mixture with a slight fog of quinaldine temporarily coming out of the solution.

Dr. Feddern has not only taken fish with this that have successfully spawned in captivity, he has tested it on corals such as star, elkhorn, pillar and some gorgonians, by squirting it directly onto the corals in open sea water. Subsequent inspections over a period of time revealed no apparent damage to the corals. Dr. Feddern told me that, if he can obtain backing and the proper location on the seacoast, he plans to breed tropical fish in captivity on a commercial basis.

Dr. Robert J. Valenti, head of the vertebrate studies division of Aquatic Sciences, Inc., has conducted studies on the effects of anesthetics on fish in captivity, and in aquiculture. Dr. Valenti has also managed to get a few species to spawn successfully in captivity. He used some drug-collected fish, but was not sure if these were ones that spawned or not. None of his studies included field tests in open water.

This seems to be the crux of the chemical-collecting controversy. The literature abounds with data from scientific studies on the effects of a wide variety of chemical anesthetics on fish, including quinaldine. But all of these have been conducted in laboratories where the amount of the drug could be precisely measured and controlled. The purpose of these studies is to provide biologists, chemists, aquarists and other scientists with exact information on the methods, chemicals and dosages which can be duplicated anywhere for safe handling, examination and transport of marine specimens.

Similar data from scientific studies in the open ocean are not available and apparently no such tests have been made. There is no doubt that some fish taken with drugs are not harmed. There is also no doubt that many more either are killed outright, are left to be eaten, or

die later in an aquarium.

The greatest unanswered question in the drug-collecting controversy is the possibility of excessive damage to marine organisms other than fish. This question has raised legal complications.

A U.S. Sports Fisheries and Wildlife paper states, "Residue analyses are required to obtain clearance and registration of all new chemicals and drugs used on fish." And the U.S. Department of Agriculture requires clearance and registration of all "economic poisons" introduced directly into the environment. Pesticide laws govern the method of application of chemical poisons, which include protection of the applicators.

Quinaldine has never been tested and registered for such clearance and American Cyanamide, one of the leading manufacturers of the drug, removed it from the market in June, 1973. A spokesman said the company was unaware of its use for fish collecting until a father ordered a bottle and requested "directions" so his 13 year old son could use it to catch some fish during a Keys vacation. After investigating, the company discontinued its sale due to possible conflict with federal regulations. The company representative said the market is so insignificant that he doubts if any manufacturer will go to the trouble and expense of making the necessary tests to obtain approval and registration.

Nobody I talked to knew of an effective substitute for quinaldine. If one is found, it will encounter similar legal problems.

So — the great drug-collecting controversy still drifts with the tide, its future is in the hands of federal bureaucracies and quinaldine bootleggers.

To this diver, juicing fish is more a moral than a legal or environmental question. The amount of poison squirted into the ocean by fish collectors may be insignificant compared to the millions of tons of toxic materials dumped by industries and cities. But, this defense is the same as saying one more beer can along a roadway won't make any real difference.

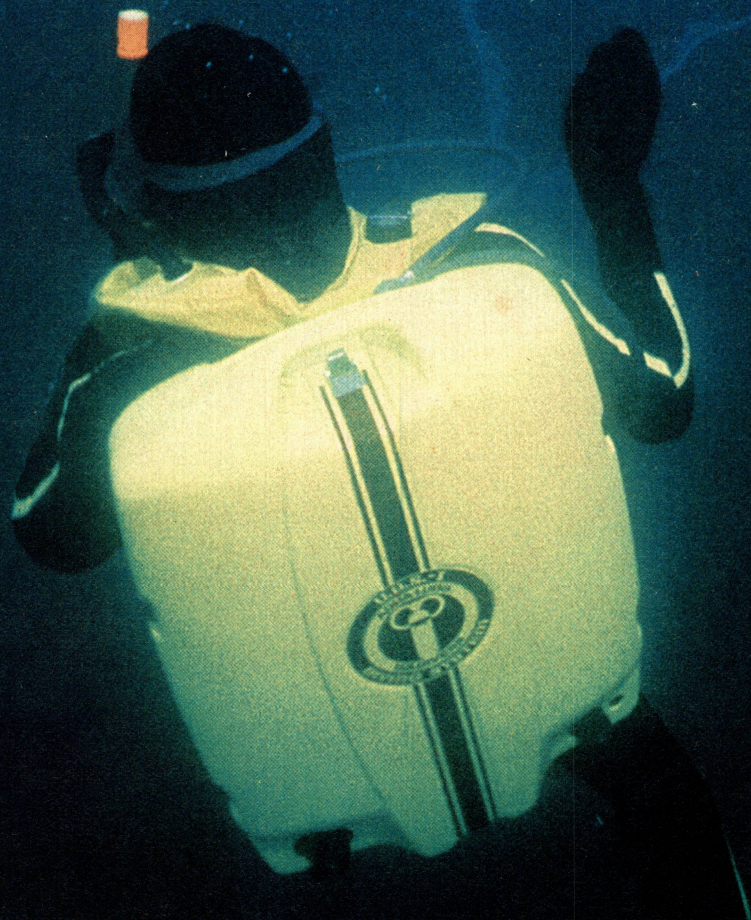
photographs by John C. Stormont/Undersea Media



David L. Curtis believes drugs cause irreversible damage to the gill and respiratory system, the overall membrane and osmotic equilibrium of the fish, and almost invariably causes irreversible liver damage.

U.S. DIVERS UDS-1

An Exclusive SDM



photography by Author

Have you ever thought about joining Captain Cousteau and his divers of the *Calypso* as they swim their way across your television screen? Of course you have — who hasn't? Chances of that happening are really pretty slim, of course, but at least you can join them in spirit when you slip into the brand new U.S. Diver's UDS-1 system and enter that fascinating and romantic underwater world.

UDS-1 simply means Underwater Diving System-1. Its concept was initiated, and its design started almost two years ago. Dave Bushatz, a young engineer at Divers, was assigned the project a year later, and was told to have it ready for delivery in 1974. Burning considerable amounts of midnight oil, Bushatz met his deadline and came up with an eye-appealing system that should be a big seller.

The design criteria was that it had to be comfortable to wear, durable, serviceable and aesthetically pleasing. And the latter criteria is indeed a welcome change. For years divers have been stereotyped in black wet suits, black fins, black masks and black accessories. It seems the most dramatic change in cosmetics has been the switch

Test Report On A New Concept In Scuba Systems

By Jack McKenney

from galvanized tanks to painted ones some 15 years ago.

UDS-1 is a totally integrated system that combines tanks, regulator, pressure gauge, harness and streamlined shroud all into one. The air supply is contained in triple 35 cubic feet, chemically anodized aluminum cylinders, D.O.T. approved to 3000 psi. This provides 105 cubic feet of air at 3000 psi — slightly more than a standard set of twin 50's.

Many manufacturers are getting ready for the higher pressure 3000 psi diving systems that we are ultimately going to be using. Some dive shops have already adapted to 3000 psi compressors. The advantage, of course, is that through stronger and improved, or slightly thicker metals, scuba gear can maintain a relatively small profile, yet deliver the same capacity of air that the older and larger type dive tanks are now delivering. For this reason small triples were used rather than bigger doubles.

The configuration of the triple 35's fits the back more proportionately than bigger doubles and provides a small, comfortable package. UDS-1 weighs in at around 55 pounds, about the same weight as a set of double 50's. The cylinders are inverted with newly designed forged manifolds (valving) located at the bottom of the tanks. The tanks are secured to the inner portion of the shroud by two anodized aluminum tank bands.

One of the most significant design changes is that the first stage of the regulator is built into the manifold. Basically it is a modified Conshelf first stage with a flexible, depth compensating seal, in place of the diaphragm normally found in the Conshelf. There is an opening in the shroud just opposite the first stage so that it can be adjusted from the outside.

The second stage is the same one that is used on most U.S. Divers single hose regulators and attaches to a fitting on the top right inner portion of the shroud. This fitting is attached to a flexible low pressure hose which is connected to the first stage manifold. There is an extra low pressure port on this same fitting which can be used for a buoyancy compensator filler hose. There is also another low pressure port (totalling three altogether) on the right side of the manifold at the base of the shroud that could be used for an air tool, or long hose octopus second stage.

The system is so designed that it can be filled repeatedly without the necessity of opening the case. The filler attachment unscrews and pulls out at the top of the shroud. A 3500 psi Pro Dive gauge constantly indicates the amount of air pressure in the tanks, so there is no need to turn on the valve to check the air pressure. I asked Bushatz about this, imagining that the constant air pressure in the hose and gauge would be detrimental, but he said that the burst pressure of the gauge components and hose is rated for 12,000 psi so it appears there is little to be concerned about.

Another unique feature is that the on/off valve is located in a slightly recessed area at the lower right, outside part of the shroud. It turns on right at the first stage. With the unit on my back I found it easy

to reach around with my right hand to turn the valve.

The reserve valve is located in the same position but on the left side of the shroud. It seems to be a common occurrence for J-valves to get hung up in kelp or knocked on parts of wrecks, inadvertently getting turned on, so the J-valve on the UDS-1 was designed to be off in the down position, and turned on when it's in the up position. All three of the tanks are used simultaneously when the diver breathes through the regulator. However, when the air is depleted to 1000 psi the left tank automatically shuts off leaving a little over 11 cubic feet of air as a reserve. When the air in the other two tanks is used up, the reserve of air can be released by turning the J-valve to the up position.

And now we come to the shroud itself! The streamlined beauty is indeed exciting to look at. It splits down the sides and is held together by six strategically placed stainless steel snaps. It's kidney shaped for the ultimate in comfort and when viewed from the back, looks as though it came right off *Calypso's* equipment rack. The shroud is thermal formed of cyclocac, a tough durable

The UDS-1 is a totally integrated system that combines tanks, regulator, pressure gauge, harness in a streamlined shroud. Air supply is from triple 35 cu. ft. cylinders.



material in the ABS family of plastics. It's possible to stand on the unit, and for durability the case incorporates an interior doubler, which adds to the impact resistance and rigidity in the base section.

Bushatz and I joined Dr. Jesse Garber and Bob Schaffer aboard Dr. Garber's 37 foot Striker for a day of testing the UDS-1 at Catalina Island. Unfortunately it was a miserable, rainy day, but we did make a couple of dives and got to know the system pretty well.

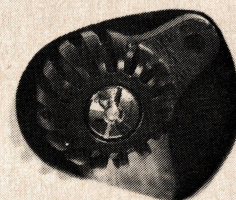
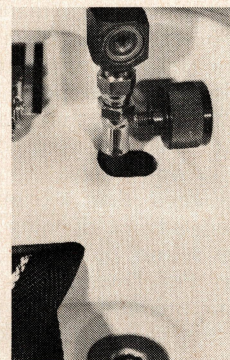
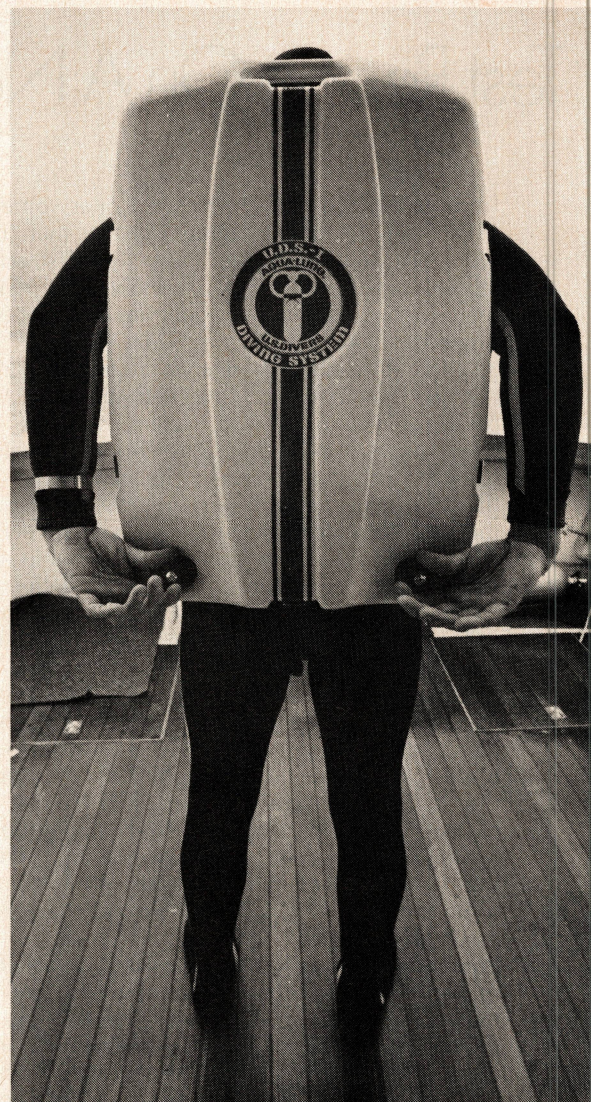
I found it was quite easy to get into the 55 pound UDS-1 by myself. It was a simple matter to slip my arms through the webbing and lift it up over my head, letting it slide down onto my back. The shroud is smooth and slid easily over my wet suit. Special quick release buckles were designed for the UDS-1 and a softer, more comfortable webbing replaces the standard stiff webbing that is found on most back packs. I loosened the straps to their largest size before slinging it on and when it was in place on my back, pulled on the free ends to instantly adjust the harness to size. A unique crotch strap clips into the waist strap, which can also be easily adjusted once the unit is on.

We hit the water! Due to the larger area of the top portion of the shroud, and the heavier valving at the bottom, the unit tended to lift slightly off the upper back while swimming, but a slight tightening of the straps eliminated this to a large extent. Also, floating straight up in the water allowed any air that was trapped inside to escape. I found the UDS-1 more comfortable to wear than a set of standard doubles because the large shroud area distributed the weight more evenly.

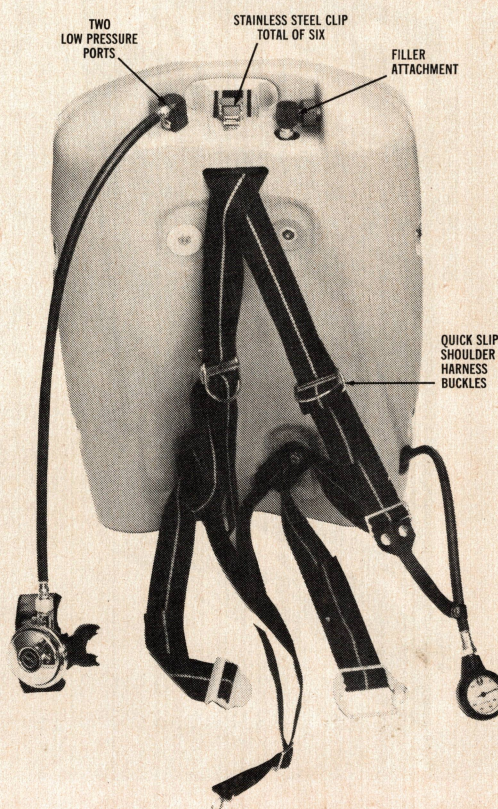
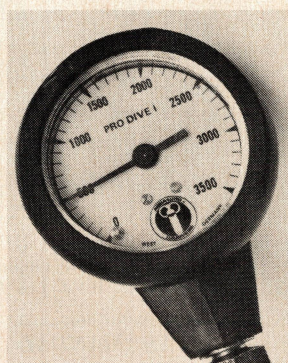
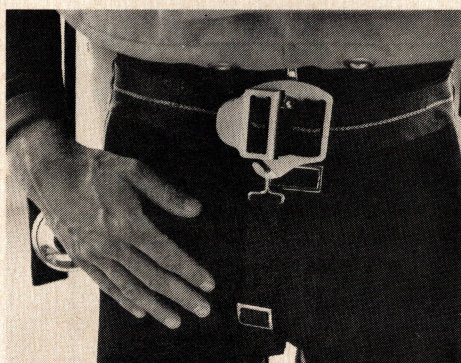
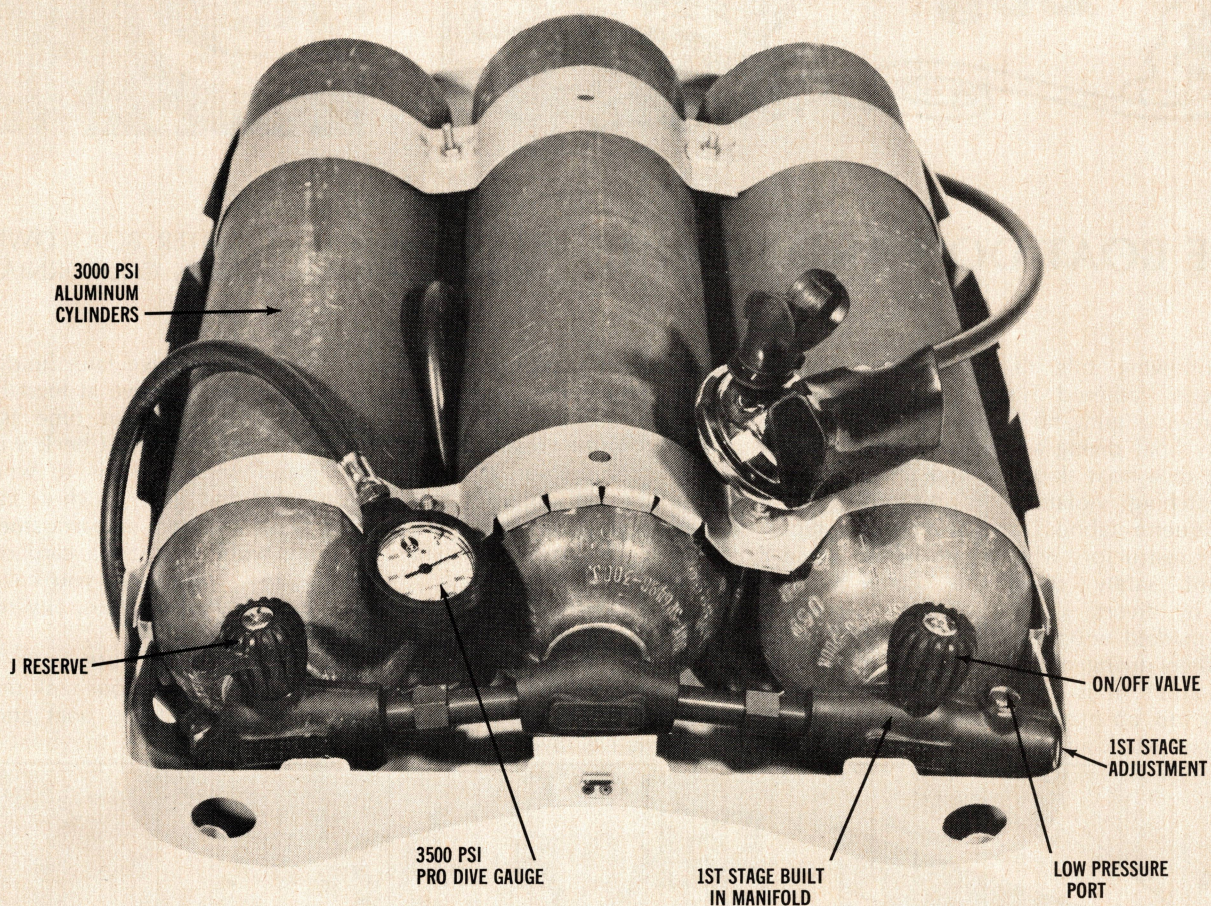
As I watched Dave swimming underwater I could almost put myself in the place of one of Captain Cousteau's Calypsonauts. Dave had on a special wet/dry suit with yellow stripes that he was also testing that day, and the UDS-1 had to be the most handsome scuba rig I've ever seen. But more than just aesthetically pleasing, the UDS-1 is a welcome change for two reasons. First, the shroud protects all valving, including the built-in first stage — there is no danger of banging these components on rocks or on boat decks. Also, the on/off valve and the J-valve are recessed, making it virtually impossible to get these tangled in any foreign matter. Secondly, although it's difficult to determine exactly how much swimming efficiency improves without using sophisticated scientific testing equipment, the factor has to be fairly large because of the smooth unbroken lines. Phillippe Cousteau told Dave that he estimated a diver would gain a quarter of a knot in swimming speed, while swimming at his normal rate of kick, by using the UDS-1 instead of a set of doubles.

Maintenance of the UDS-1 is simple. Unclip the shroud and thoroughly flush the unit with fresh water.

We're evolving into an exciting era in diving, and the UDS-1 system is an exciting piece of scuba gear that compliments the innovative and futuristic thinking of U.S. Divers Co. If you want to see one of these units for yourself, stop in at your favorite dive shop and ask for a demonstration. The UDS-1 retails for \$499. That's only \$90 more than a set of Mark II twin 50's with back pack, a Conshelf XII regulator and a Pro Dive gauge. The UDS-1 is a bit more for sure, but then, you're getting so much more! >#>



The on—off valve of the UDS-1 is located in a slightly recessed area at the lower right, outside part of the shroud. The reserve valve is located in the same position, but on the left side. They can easily be reached while diving.



The filler attachment of the UDS-1, shown far left, unscrews and pulls out at the top of the shroud so the unit can be filled without opening the case. Special quick release buckles were designed for the UDS-1, and its unique crotch snap clips into the waist strap. A 3500 psi Pro Dive gauge constantly indicates the amount of air pressure in the tanks, so there is no need to turn the valve to check pressure.



DIVE BOAT DO'S AND DON'TS

A GUIDE FROM THE CHARTER BOAT OWNERS ASSOCIATION OF SOUTHERN CALIFORNIA

The following bits of information have been gathered from a variety of sources: "gung-ho" divers who swear by boat diving as the only way to dive; dive boat skippers who grow gray watching violations of various boat etiquette taboos; and from underwater instructors who cringe while important safety rules are being broken by divers.

Well marked equipment has special value when diving off a boat. In tight deck quarters, it is very easy to misplace or mix up masks, fins and other equipment. Mark all your gear before-

hand so you can keep track of it. Pack your gear the night before, and check against a list. Be sure your tank is full before arriving at the boat. Even if the boat has a compressor, it is subject to failure and starting with a full tank will permit you to have at least one tank dive while repairs are made.

Arrangements must be made in advance if you are to sleep aboard the boat overnight. Because of Coast Guard regulations, there must be a crewman aboard any time the bunk space is occupied. Also, be sure to set up an alternative dive location.

Divers often arrive late, holding up the whole boat. Arrive at least half an hour before departure time to park your car, sign in, etc. Check with the deckhand or skipper as to where to store your dive gear, lunch or camera. Don't cause later embarrassment by arriving without a scuba card or fishing license. Make sure you have money to pay the boat fees, any refreshments or air refills.

When suiting up, use your buddy to help you. To put your tank on, lean against the rail of the boat and face toward the center of the boat to be



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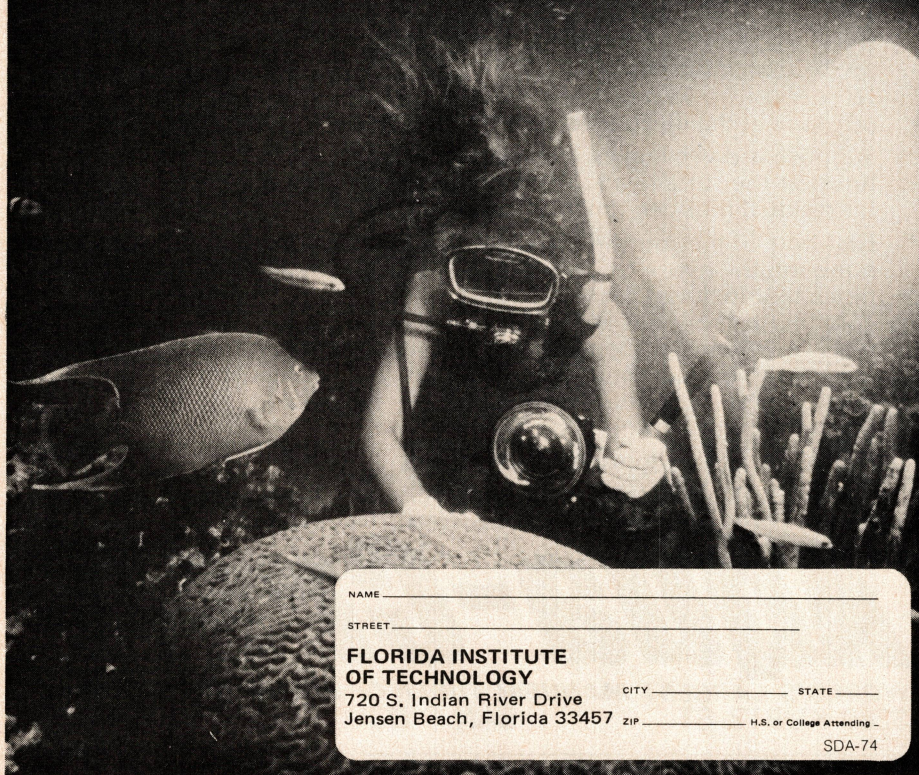
For the sake of safety and the utmost enjoyment of diving—your own and your buddies'—it is a good idea to follow these simple procedures. 

SKIN DIVER/APRIL 1974 61

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Innerspace Flight

(Continued from Page 47)

Soon I was alongside Cousteau's sub. He looked out the port and with the broad friendly smile I had come to appreciate, he said, "Merry Christmas, Joe." "Joyeux Noel, Commandant," I returned, speaking my best French into the microphone.

We headed down the steeply inclined canyon axis between rough creviced walls that in some places even narrowed so I could see both walls at once through my tiny port. It was like passing down a corridor in an art gallery. In each small depression or on promontories was a wide selection of fish. I kept my finger on the camera button as we passed rockfish, zebrafish, snake mackerel, and at one spot, a large silky shark, poised and motionless.

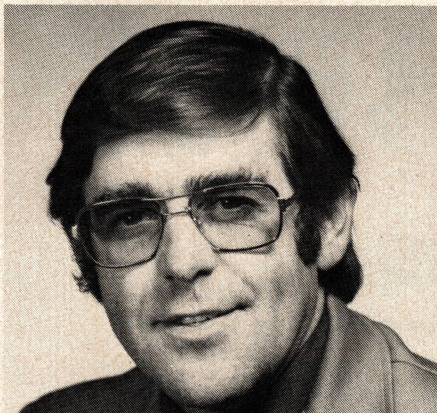
I continued to lead the way to about 700 feet when in an especially tight corner I bumped a rock with one of my water jets. The vehicle slowed and was only able to limp along. Cousteau went ahead for awhile. Finally we crawled slowly back up the slope out of the canyon and returned to the surface as the first light of a new day was stretching over the angular volcanic rocks. To some unsuspecting native fisherman, one yellow beetle-looking monster might have occasioned genuine fright as it bobbed on the surface. As it was, only our friends on *Calypso* had been keeping watch on Christmas day.

Madame Cousteau and several of the crew had foraged about *Calypso*, anchored near the seemingly barren island, and found an "Arbre de Noel" as well as other trimmings that helped liven up the *Calypso's* wardroom and deck it properly for Christmas. That evening the whole of the *Calypso* team sat about celebrating with pate, wine and a bit of the remaining champagne. We sang French carols and were given small presents. What more could anyone ask of an expedition in the tropics at Christmas!

Soon after our return to Cabo San Lucas, I had to leave the happy and idyllic life aboard *Calypso* for the more conventional aspects of my job in Los Angeles. I knew that *Calypso* would continue doing what she had done for over 20 years—searching out the wilderness of the vast world beneath the oceans. I was sure as our small aircraft climbed, circling above that beautiful white ship in the blue Mexican water, that she would never become obsolete. Certainly I hoped to visit her again and again. >

NEW DEMA OFFICERS

At a recent meeting, the members of DEMA (Diving Equipment Manufacturers Association), elected as president and treasurer, respectively — Chuck Buchanan, national sales manager of Sportsways Co., and Richard Bonin, president of Scubapro.



Chuck Buchanan



Dick Bonin

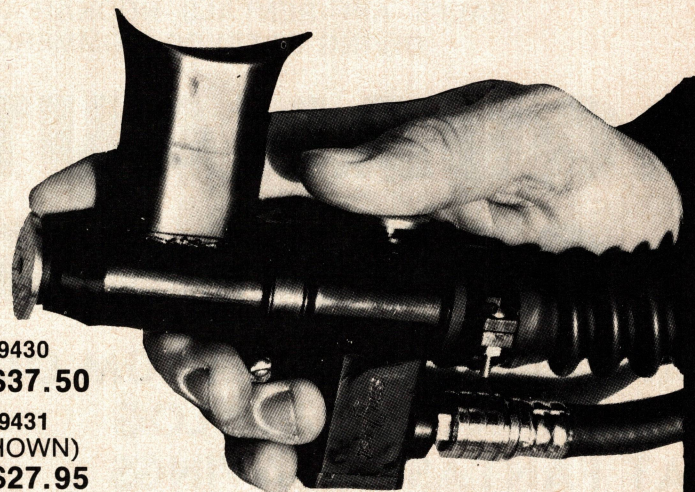
DEMA membership is composed of full line manufacturers, specialty manufacturers and service related diving businesses. The goal of DEMA is to contribute toward the growth, safety and education of diving. >#

NASDS COLLEGE APPROVED

The National Association of Skin Diving Schools (NASDS) Instructional College, based in San Diego, California, has been given state approval on its instructional course. Three of the instructors at the college are UDT-Seal trained and two are tenured teachers in the school system of the State of California.

The NASDS Instructional College, started in 1969, is the oldest program of its type in the world. The purpose of the college is to fill the current void in the sport diving industry and provide the diving industry with full time diving equipment instructor-counselors. For more information about the college contact: NASDS Educational Division, 1214 Rosencrans Ave., San Diego, Calif. 91206. >#

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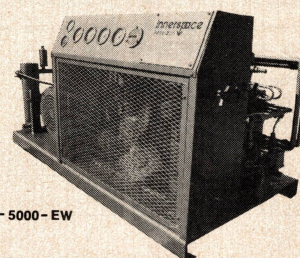
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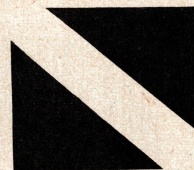
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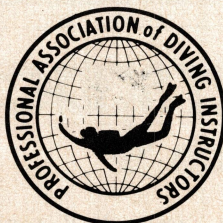
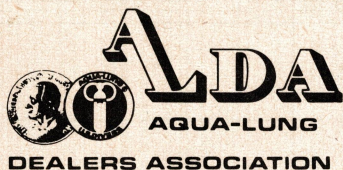
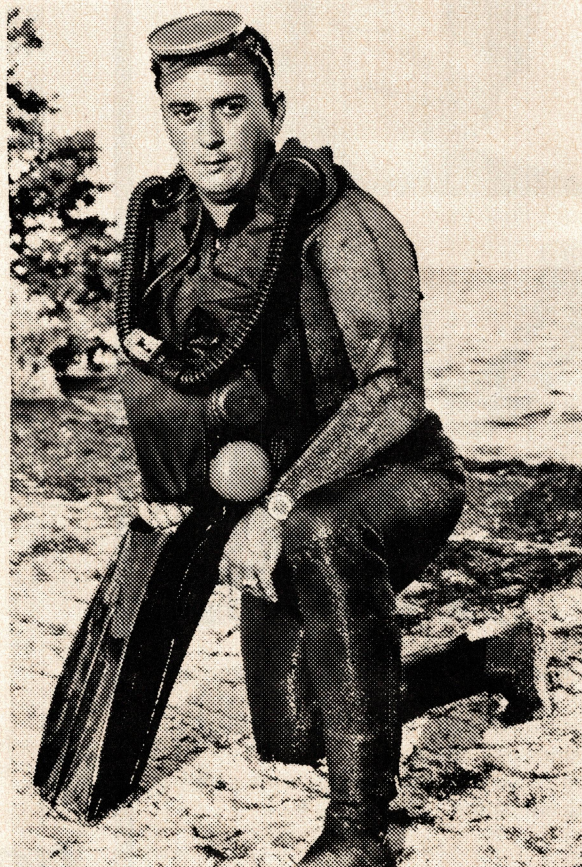
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FRANK SANGER, PRES.

Frank Sanger, former vice president of New England Divers, was recently appointed president of Parkway Fabricators, a subsidiary of Great American Industries. The announcement was made by Burton Koffman, president of Great American, from the company's main office in Perth Amboy, New Jersey. Sanger will replace Frederick Weiss who resigned. Weiss has not announced his long range plans.



Koffman also announced the merger of Poseidon Systems U.S.A. with Parkway Fabricators. Poseidon will continue to operate as a division of Parkway Fabricators. ➤

NEW DIVING LOCKER

The Diving Locker of San Diego, Calif., recently opened its newest store in Solana Beach, about 20 miles north of San Diego along Highway 101. The store will offer a wide variety of quality equipment, scuba classes, underwater photography classes, an air station and repair services.



Tom Harman is the manager of the newest Diving Locker. He brings with him 12 years of diving experience, and is especially at home with a camera and strobe in his hands. Terry Nicklin, who has been associated with the Diving Locker since its inception in 1959, will work with Tom in the shop and instruct the new store's scuba classes. ➤

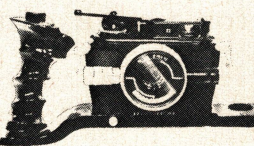


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NAUI/YMCA Crossover Certification,
Temple University, Philadelphia, Pa.
(Contact: NAUI Mid-Atlantic Branch,
Drawer C, Deepwater, N.J. 08023.)

April 7-13

NAUI Instructors Certification Course,
Santa Barbara, Ca. (Contact: NAUI Pa-
cific Branch, 867 Basin Street, San
Pedro, Calif. 90732.)

April 13-20

NAUI Instructor Certification Course,
Portland, Maine. (Contact: NAUI North
Atlantic Branch, Box 291, Back Bay
Annex, Boston, Mass. 02117)

April 15

Professional Diving Instructor Course,
Monterey, Calif. (Contact: Ed Brawley,
598 Foam St., Monterey, Calif. 93940)

April 18-June 7

NASDS College, San Diego. (Contact:
NASDS Educational Division, 1214 Rose-
crans, San Diego, Calif. 92106)

April 19-21/May 17-19

YMCA Instructor Institute, Bremerton,
Wash. (Contact: Bremerton Armed Serv-
ices YMCA, Bremerton, Wash.)

April 20-21

YMCA, Scuba Instructor Institute.
Springfield, Ohio. (Contact: Fred D.
Crown, 7459 Dixie Hwy. No. 3,
Florence, Kentucky 41042)

April 21

YMCA Instructors Institute, Rochester,
N.Y., (Contact: Jack Radley, 49 Shore-
way Dr., Rochester, N.Y. 14612)

April 26-28/May 4-5 & 11-12

PADI Instructor Certification Institute,
Chicago. (Contact: Ralph D. Erickson
23R, 6301 N. Sheridan Rd., Chicago,
Illinois 60660)

April 26-28/May 17-19/June 7-9

YMCA Instructor Institute, Maryland.
Contact: George Knode Jr., 25 Vermont
St., Williamsport, Md. 21795)

April 27-28

YMCA Instructor Institute, Houston, Tex-
as. (Contact: Jan McGinnis, 10010
Memorial #1413, Houston, Texas 77024)

April 27-May 5

YMCA Instructors Institute, Anthony's
Key, Roatan, Honduras. (Contact: Tom
Mount, Diving Officer, U. of Miami,
10 Rickenbacker Cswy., Miami, Fla.)

May 4-5 (1st of 6 weekends)

NAUI Instructor Certification Course,
Rockport, Mass. (Contact: NAUI North
Atlantic Branch, Box 291, Back Bay
Annex, Boston, Mass. 02117)

May 5-6

YMCA, Scuba Instructor Institute.
Springfield, Ohio. (Contact: Fred D.
Crown, 7459 Dixie Hwy. No. 3,
Florence, Kentucky 41042)

- May 6-11
UNEXSO Concentrated NAUI Certification Course. (Contact: UNEXSO, 1148 N.E. 48th St., Pompano Beach, Fla.)
- May 17-19/June 7-9/June 28-30
YMCA Instructor Institute, Des Moines, Iowa. (Contact: Ivor L. Thomason, 101-109 Locust St., Des Moines, Iowa)
- May 18-19
YMCA Instructor Institute, Houston, Texas. (Contact: Jan McGinnis, 10010 Memorial #1413, Houston, Texas 72024)
- May 18-25
NAUI Instructor Certification Course, Baton Rouge, La. (Contact: NAUI Southwest Branch, 2120 Peckham St., Houston, Texas 77019)
- May 18-26
NAUI Instructor Certification Course, (French language) St. Jean, Quebec, Canada. (Contact: NAUI Canada, 10 Monet Ave., Etobicoke, Ont., Canada)
- May 19
YMCA Instructors Institute, Rochester, N.Y., (Contact: Jack Radley, 49 Shoreway Dr., Rochester, N.Y. 14612)
- May 20
PADI Instructor Certification Course, Seattle, Wash. (Contact: John Ritter, Divers Institute of Technology, Dept. S, Box 70312, Seattle, Wash. 98107)
- June 8-9
YMCA Instructor Institute, Houston, Texas. (Contact: Jan McGinnis, 10010 Memorial #1413, Houston, Texas)
- June 8-9
YMCA Instructors Institute, Rochester, N.Y., (Contact: Jack Radley, 49 Shoreway Dr., Rochester, N.Y. 14612)
- June 15-24
NAUI Instructor Qualification and Training Course, Eureka, Calif. (Contact: NAUI Mid-Pacific Branch, 816 (Columbia, Santa Cruz, Calif. 95060)
- June 22-29
NAUI Instructor Qualification and Training Course, Scripps Institute, San Diego, Calif. (Contact: NAUI South-Pacific Branch, 1867 Reed, San Diego, Calif. 92109)
- June 28-30
NAUI Cross-Over Program for Certified YMCA Instructors to become NAUI Instructors. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)
- June 29-30
YMCA Instructor Institute, Jonesboro, Ark. (Contact: Glenn Galtere, 2806 Harrisburg Rd., Jonesboro, Ark. 72401)
- July 2-September 6
NASDS College, San Diego. (Contact: NASDS Educational Division, 1214 Rosecrans, San Diego, Calif. 92106)
- July 8
Professional Diving Instructor Course, Monterey, Calif. (Contact: Ed Brawley, 598 Foam St., Monterey, Calif. 93940)
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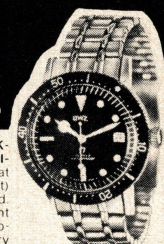
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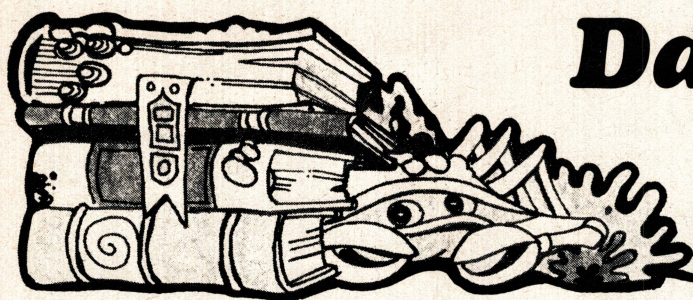


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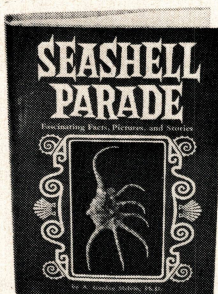
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Davy Jones Review

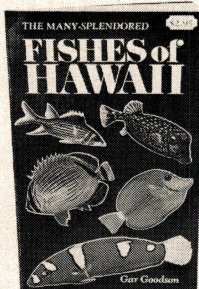
SEASHELL PARADE — by A. Gordon Melvin, PhD/\$11.50. A quarter-century of shell collecting has given the author an incredible knowledge of shell lore. In this book he offers practical advice on matters including methods of cleaning and displaying shells, as well as presenting an array of strange facts, colorful legends and exciting adventures related to shells. Illustrated. Charles E. Tuttle Co., Rutland, Vermont 05701.



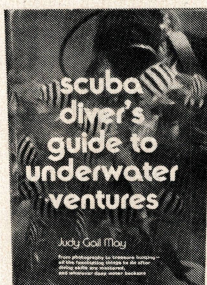
MARINE INVERTEBRATES — by U. Erich Friese/\$9.95. Salt-water aquarists will be delighted with this new book which discusses 14 different phyla of marine invertebrates from an aquarium management point of view. Information about the biology, care, feeding and selection of this group of animals — from sea anemones to squids — includes 120 color photos. T. F. H. Publications, 211 W. Sylvania, Neptune, N.J. 07753.



MANY-SPLENDORED FISHES OF HAWAII — by Gar Goodson/\$2.95. A great book for the fish-watcher; that non-technical, curious person, whether casual tourist-swimmer, scuba diver, fisherman or aquarist who seeks to know more about Hawaii's abundant and beautiful marine life. Describes 170 Hawaiian fishes, complete with color pictures and bibliography. Marquest Color Guide Books, Box 132, Palos Verdes Estates, Calif. 90274.



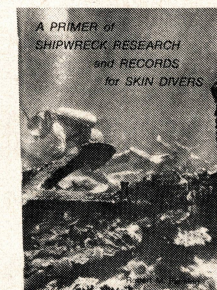
SCUBA DIVER'S GUIDE TO UNDERWATER VENTURES — by Judy Gail May/\$5.95. Everything from where to sign up for skin diving lessons to how to make a living at your favorite sport is discussed in this comprehensive new book. Completely illustrated chapters cover techniques of underwater photography, wreck diving, cave diving, sightseeing U/W, etc. Stackpole Books, Cameron and Kelker Sts., Harrisburg, Penna. 17105.



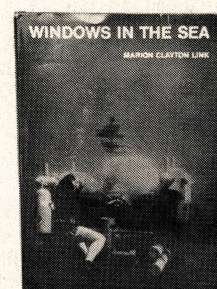
IN SEARCH OF ADVENTURE — by Bill Kinsey/\$3.50. One delightful episode after another are portrayed in this exciting book by a skin diving adventurer. In a constant quest for fun and discovery, the author has traveled from North Carolina to the Philippines, through Florida and off the West Indies to explore sunken ships, lost planes, WW II camps and so on. Exposition Press, Inc., 50 Jericho Turnpike, Jericho, N.Y. 11753.



A PRIMER OF SHIPWRECK RESEARCH AND RECORDS FOR SKIN DIVERS — by Robert M. Fleming/\$2.75. Divers who are interested in the origin and details of a wreck disaster should be happy to find this informative new publication. The author discusses books, charts, newspapers, periodicals and microfilm that will offer divers clues in his research of wrecks around the world. Global Mfg. Corp., Box 4714, Milwaukee, Wis. 53215.



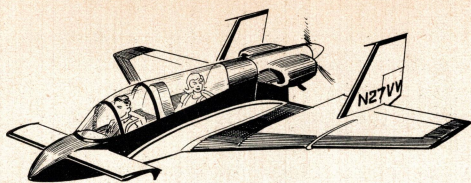
WINDOWS IN THE SEA — by Marion Clayton Link/\$12.50. To oceanographic pioneer Edwin Link, the launching of the Johnson-Sea-Link was the culmination of a dream begun almost two decades before. Marion Link, a journalist and enthusiastic supporter of her husband's underwater ambitions, describes the fascinating events which led to the project. Thoroughly illustrated. Smithsonian Institution Press, Washington, D.C. 20560.



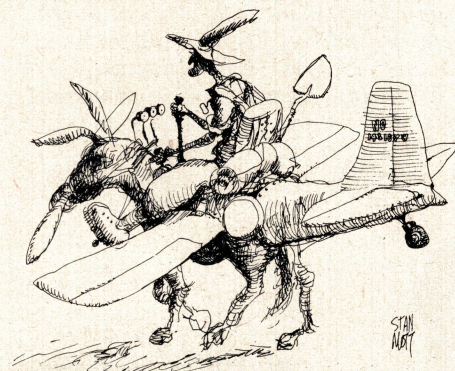
DIVING GUIDE TO THE FLORIDA KEYS — Edited by Pete Velde and Ned DeLoach/\$2.95. This handy book features maps and directions to diving sites and wreck locations in Pennekamp Coral Reef State Park, the Upper, Middle and Lower Keys plus the Dry Tortugas, Marquesas and Cay Sal Bank. It also includes tips on camping and diving services in the Keys. New World Publications, 6043 Greenberry Lane, Jacksonville, Florida 32211.



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August 17-24

NAUI Instructor Qualification and Training Course, Chicago, Ill. (Contact: NAUI Mid-America Branch, Box 14156, University Station, Minneapolis, Minn.)

August 24-September 1

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August 31-September 3

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September

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September 7-14

NAUI Instructor Qualification and Training Course, Palm Beach Shores, Fla. (Contact: NAUI South Atlantic Branch, P.O. Box 10356, Riviera Beach, Fla.)

September 7-8/29-30/Oct. 11-13

YMCA Instructor Institute, New Jersey. (Contact: John J. Geary, 10-07 Bellair Ave., Fairlawn, N.J. 07410)

September 7-8

YMCA Instructor Institute, northeast region. (Contact: Walter Hornberger, 7161 Spire Falls Rd., Gansevoort, N.Y.)

September 21-22

YMCA Instructor Institute, Dallas, Texas. (Contact: D. Pat Ryan, 4332 Northaven Rd., Dallas, Texas 75229)

September 30-December 6

NASDS College, San Diego. (Contact: NASDS Educational Division, 1214 Rosecrans, San Diego, Calif. 92106)

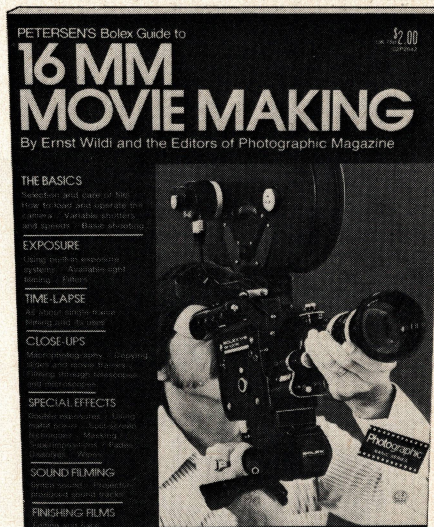
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YMCA Instructor Institute, Albany and northeast region. (Contact: Walter Hornberger, 7161 Spire Falls Rd., Gansevoort, N.Y. 12831)

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Everyone loves a good success story. Whenever I hear a tale of how someone turned \$1 into \$1 million, I always take notice. Recently when I heard how \$1 exploded into \$8 million, I stood at attention and saluted!

Scubapro/Under Sea Industries is a fantastic tale of success. Gustav Dalla Valle (president, Under Sea Industries), one of the world's foremost pioneers of diving, spent many of his early underwater years snorkeling and spearfishing around Europe during a time when most folks had no idea what a snorkel was. In 1963, Dalla Valle became legal owner of the name "Scubapro" for the proverbial \$1, and that's where our story begins.

Says Dick Bonin (president and general manager of Scubapro and current treasure of DEMA): "We could not have had a more humble beginning. There was

and is now traded on the Over-The-Counter Market. It's interesting to note that USI is the only company on the stock market that is strictly into diving.

In looking back over the truly innovative designs that have surfaced in diving equipment, it's not hard to see that Scubapro has been responsible for many of the bigger splashes. For example, Scubapro's Jet Fin has become very nearly the generic word for swim fins. Since imitation is a form of flattery, Scubapro might well be flattered that everyone has been trying to imitate the Jet Fin, with its patented vented feature.

Scubapro currently has a few things cooking that will appear on the market sometime this year. One hot product is the multiple tissue decompression computer which will compute four separate body tissues (such as fat,

SCUBAPRO

By Hillary Hauser

BY THE PROS, FOR THE PROS



Scubapro's sales team (L to R: Jim Christiansen, Rosemary Gary, Mike O'Connor, Dick Bonin, Joe Schuch, Mike Brock) concentrates on smaller retailers, developing the retailers' market and level of professionalism so that they literally grow with the company.

Dick Bonin, president and general manager of Scubapro worldwide.



photography by Jack McKenney

Gustav Dalla Valle, myself, two girls, and a shipping clerk. We had no money, no products and no customers. All we had was an idea."

The idea was their pro-store policy. Says Bonin, "Scubapro is basically a philosophy of professionalism from a product attitude of how we sell our products and to whom we sell our products." They will not sell products to just anyone who wants to sell them. You will not find Scubapro products in department stores, hardware stores or novelty shops that have sales clerks uninterested in diving. You will only find Scubapro products in specialized diving retail outlets — full-service stores that have all the requirements: full knowledge of repair, service, and more important, instruction. What this pro-store idea means to the consumer (the diver) is that he is guaranteed the knowledge and expertise of franchised store owners who are usually divers or persons familiar with problems and idiosyncrasies of the sport.

This pro for pro concept was an expensive idea to get off the ground. If Scubapro had only been sales oriented, the pro-shop sales philosophy wouldn't have lasted a year. But, Dalla Valle and Bonin had great faith in the fact that it was the best way to serve the dealer and the consumer, and they felt that the rather strained initial effort would pay off. History has proven them right. Last year Under Sea Industries did \$8 million in business. Business is so booming with Scubapro that in fall of 1972 Under Sea Industries went public

bone, muscle and blood). Nitrogen is absorbed and eliminated at different rates in different tissues of the body; the new computer will allow for a greater degree of accuracy in decompression. If this new decompression computer measures up to current expectations, it will be one of the biggest safety innovations in diving.

Another new goody soon to emerge from Scubapro's R & D dept. in Compton, Calif., is a new advanced system in regulators. The regulators will have a pilot valve balanced second stage whereby the diver's inhalation effort will only be required to actuate the very sensitive pilot valve. The pilot valve will then actuate the demand valve that delivers the diver's air. (In standard regulators the inhalation effort of the diver opens the demand valve.) What the new system means to the diver is that breathing effort required at depth will be substantially the same as it would be at the surface.

Scubapro has a fantastic history of high-quality regulators (traditionally their strongest selling item). The company has a record of every regulator that has been sold, from regulator number one to the last one sold yesterday. The company follows up on each regulator sale with a query letter sent to the purchaser to encourage instruction if the purchaser has had none. Says Bonin, "We realize our responsibility to the sport, not just the industry." The sales force adds, "We feel what's best for the sport is best for the business."

And business is what Scubapro's got. ➤

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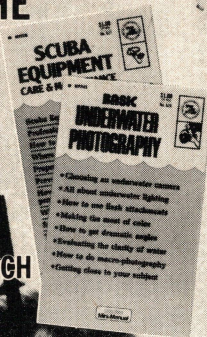
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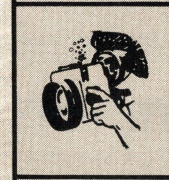
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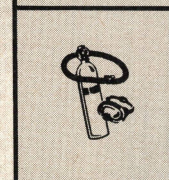
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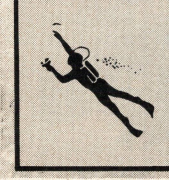
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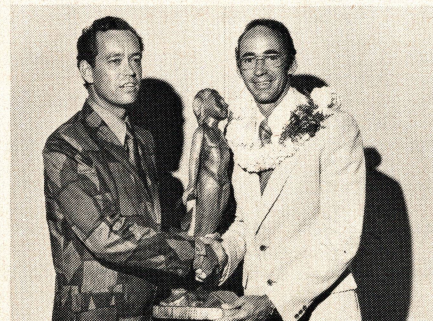
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BROOKS WINS TRITON

Ernest H. Brooks II, president of Brooks Institute in Santa Barbara, California, was presented with the Triton award at Innerspace Pacifica in Honolulu last November. Innerspace Pacifica is the annual international sea symposium/film festival sponsored jointly by the Hawaii Council of Diving Clubs, the University of Hawaii and the State of Hawaii.



Ernest H. Brooks II, right, receives the Triton Award from Donald Bowman

Brooks was presented this award for his "unique, outstanding contributions to science and underwater photography." He and Jack Drafa, a Brooks alumnus and staff undersea research specialist, opened and closed the festivities in Honolulu with two computerized multi-media programs. One of their presentations, *In the Beginning*, features the small living species of the sea; *In Search of Tomorrow* is an adventure series about a child and sea animals.

APRIL 15 DEADLINE

April 15 is the entry deadline for the 1974 Underwater Society of America photo contest. This year the competition is divided into three classifications: saltwater, freshwater and special effects. Each division contains four categories: black and white prints, color prints, slides and movies (with the exception of the special effects division which does not include movies.)

The contest is of the elimination type — only those entries that have won in any previous competition are eligible to enter. The previous contest, however, need not be associated in any way with the Underwater Society of America. The thought behind the elimination contest is to compete award winning entries against each other, thus allowing the entrant a chance to compare his work.

The rules and entry forms for the photo contest are available through your council, dive shop or by writing to: John Hall, Underwater Society of America, Box 407, St. Louis Mo. 63074. Tel: (314) 426-2052.

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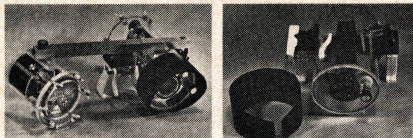
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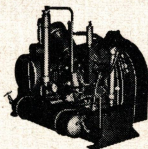
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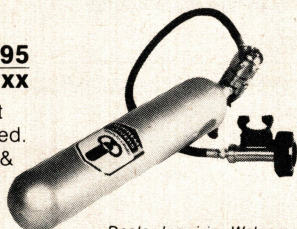
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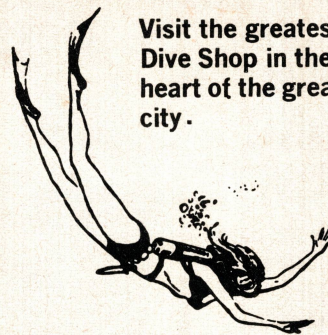


- Apr. 2—TRUK/PONAPE—11 days, Innerspace Adventures, Hickam, Hawaii
- Apr. 5—COZUMEL/AKUMAL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Apr. 5—NASSAU—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- Apr. 5, 12—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
- Apr. 6—BONAIRE—9 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- Apr. 7—SPANISH HONDURAS—6 days, Grand Am Int'l Tours, Ocala, Fla.
- Apr. 9—CARTAGENA, COLOMBIA—11 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Apr. 10—ROATAN/HONDURAS—6 days, Island Reef Safaris, Wilton, Conn.
- Apr. 13—ROATAN/HONDURAS—7 days, Kathy Taylor, Island Reef Safaris, Wilton, Conn.
- Apr. 14—CAYMAN BRAC—7 days, U/W Explorers Society, Pompano Beach, Florida.
- Apr. 15—HAWAII/KONA—8 days, Photomarine Int'l Travel, Reseda, Calif.
- Apr. 17—GREECE—8 days, Chalet Club, New York, New York
- Apr. 19, 26—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
- Apr. 19—TAHITI/RANGIROA—9 days, Photomarine Int'l Travel, Reseda, Calif.
- Apr. 19 — COZUMEL/YUCATAN — 7-12 days, See & Sea, Inc., San Francisco, California.
- Apr. 20 — TRUK/PALAU — 15 days, Atlantis Safaris, Miami Shores, Fla.
- Apr. 20—SP. WELLS, BAHAMAS—7 days, Skin Diving School, Bronx, N.Y.
- Apr. 20 & 30 — FREEPORT—7 days, Adventure Cruises, Ft. Lauderdale, Fla.
- Apr. 21 — COZUMEL — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Apr. 21—BONAIRE/CURACAO — 10 days, Dewey Bergman, See & Sea, San Francisco, Ca.
- Apr. 26 — BAHAMAS—3 days, Grand Am Int'l Tours, Ocala, Fla.
- Apr. 27 — TRUK/PALAU — 15 days, Atlantis Safaris, Miami Shores, Fla.
- May 3, 10, 17, 24, 31—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
- May 5—ROATAN—7 days, Underwater Explorers Society, Pompano Beach, Florida.
- May 11—NASSAU—7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- May 12—GRAND CAYMAN—9 days, Photomarine Int'l Travel, Reseda, Calif.
- May 14—ROATAN/HONDURAS—17 days, Chalet Club, New York, N.Y.
- May 17—COZUMEL/YUCATAN — 7-12 days, See & Sea, Inc., San Francisco, California.
- May 17—SPANISH HONDURAS—4 days, Grand Am Int'l Tours, Ocala, Fla.
- May 18 — GREEK ISLANDS — 17 days, Emery Travel Service, Bradford, Pa.
- May 18—GRAND CAYMAN—7 days, Skin Diving School, Bronx, N.Y.
- May 19—BONAIRE/CURACAO — 10 days, Rick Tegeler, See & Sea, San Francisco, Calif.
- May 19 — COZUMEL — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- May 20—BIMINI—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- May 23—HONDURAS—7 days, Kathy Taylor, Island Reef Safaris, Wilton, Conn.
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- May 25—CAYMAN ISLANDS — 8 days, See & Sea, Inc., San Francisco, California.
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(Continued on Page 90)

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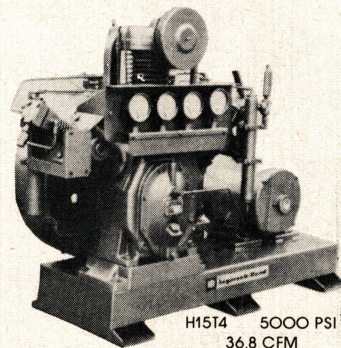
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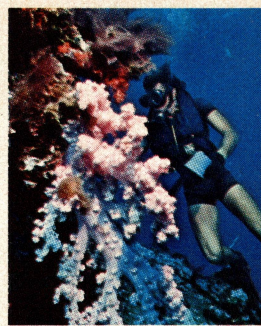
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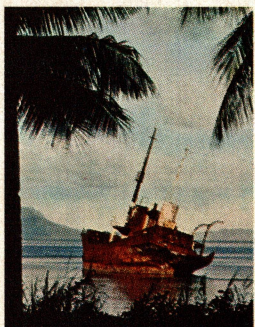
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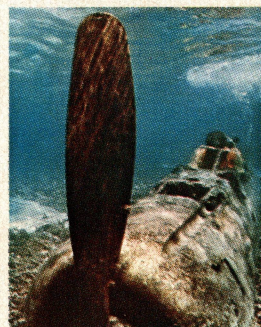
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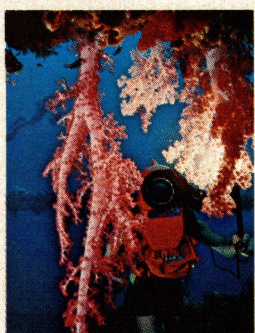
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The Redlip Blenny

(*Ophioblennius atlanticus*)

The eel-like blennies exhibit a strange dichotomy of character: they look somehow frog-like and a bit silly, but are in truth one of the most intelligent fishes in the sea. Ichthyologists have long noted the hand and foot-like use of the pelvic fins among the blennies. These pelvic fins are the chief identifying feature of these fish; they are positioned in front of the pectoral fins and are quite strong. Blennies can lift themselves up on these fins for a look-see around their lairs; they can walk with these fins and often use them like hands to manipulate objects. Blennies have big eyes and appear to be quite alert. Those that eat invertebrates hunt by sight. These fishes have no apparent fear, and allow divers to come close for observation. Carleton Ray and Elgin Ciampi have even reported that blennies have crawled over their bodies by walking across them with their pelvic fins. □ The redlip blenny is one of the most common fishes on West Indian reefs. The adults are dark brown and have high, steep, blunt-headed profiles. There are single tentacles above each eye. The fish is decorated with red areas, most notably the lips, which is responsible for its common name. Red markings also appear on the tail, dorsal fin and on the pectorals. The redlip blenny has a dark spot behind the eye, which provides another key clue to its identification. □ The young redlip blenny is rather different in appearance from the adult and was once identified as an entirely different fish. It is torpedo-shaped and pale overall. As it grows, the front part of the fish, beginning with the head, becomes dark. Intermediate phases are often seen where the color scheme is half and half. □ The behavior of the blennies during the mating season is a bit comical. The male selects the nest and attracts the

female by either doing push-ups on his pelvic fins, or by bumping her with his nose. Sometimes the female will initiate the courtship procedure. The male guards the eggs and chases off intruders until they hatch. After completing the larval stage, the young torpedo-like blenny enters a littoral environment (i.e., estuary) and begins to adopt the steep facial profile and colors of the adult. The redlip blenny grows to about four and one-half inches. □ The blennies have been segmented into three different families of fishes.

The combtooth blennies (Blenniidae) are characterized by the forward pelvic fins, a single series of closely set, comb-like teeth, and a lack of scales. The redlip blenny falls into this category. The scaled blennies (Clinidae) also have the forward pelvic fins but have scales on the body (none on the

head) and more spines in the dorsal fin than the Blenniidae. Ichthyologists differ on the third group of blennies. Randall has segmented out a group he calls flag blennies (Chaenopsidae) because of the elevated spinous dorsal fin of the males. Bohlke and Chaplin label their third group Tripterygiidae (three-fin blennies) because the dorsal fin of the fish included in this group is divided into three distinct segments rather than the two or one of other Bahamian fishes. In any case, it points up the difficulties of working with the blennies. There are over 500 species of them in all. □ The redlip blenny is found in great numbers throughout the Caribbean. Bohlke and Chaplin have recorded them from No. Carolina south through the Lesser Antilles, along the Gulf of Mexico and Central American coast. The diver will see the redlip blenny in shallow water, most often in rocky, surge places, where the fish scours for its food — mainly algae and organic detritus. ➤

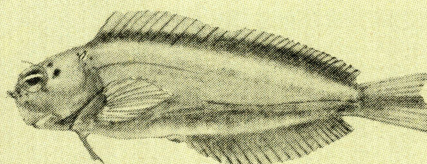


Photo By Jack McKenney - Text By Hillary Hauser

Photo taken in 10 feet of water off Anthony's Key, Roatan, Honduras. McKenney used a Rollei-marlin camera, with a Honeywell strobe, Ektachrome X film, 1/125 at f11, 2 feet from subject.





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Guam... Gateway To



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Visiting diver Doris Tzimoulis examines coral encrusted twin bollards on the deck of a sunken American tanker in Apra Harbor. A timid hermit crab plays hide 'n seek with underwater cameraman on a coral reef off Anae Island. A lovely arrangement of tube sponges decorates the mooring chain marking the location of the sunken Japanese freighter, Tokai Maru, in Guam's Apra Harbor.



Micronesia

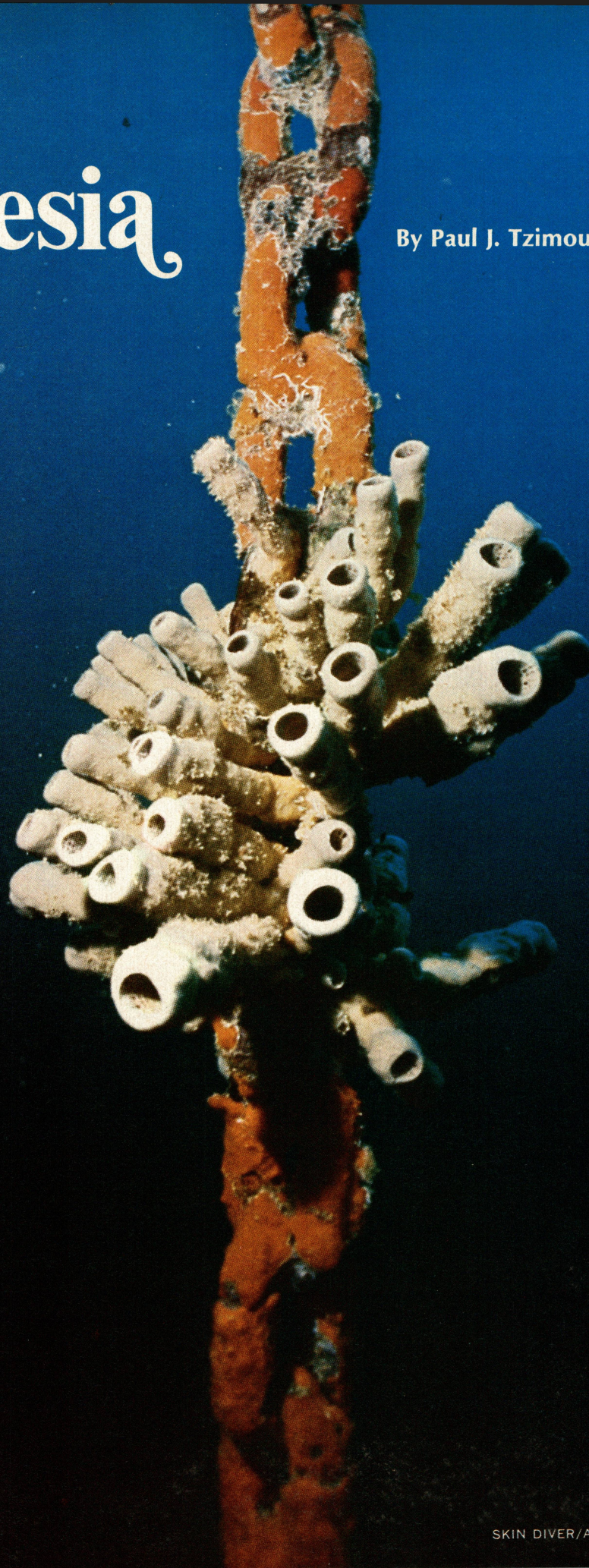
By Paul J. Tzimoulis

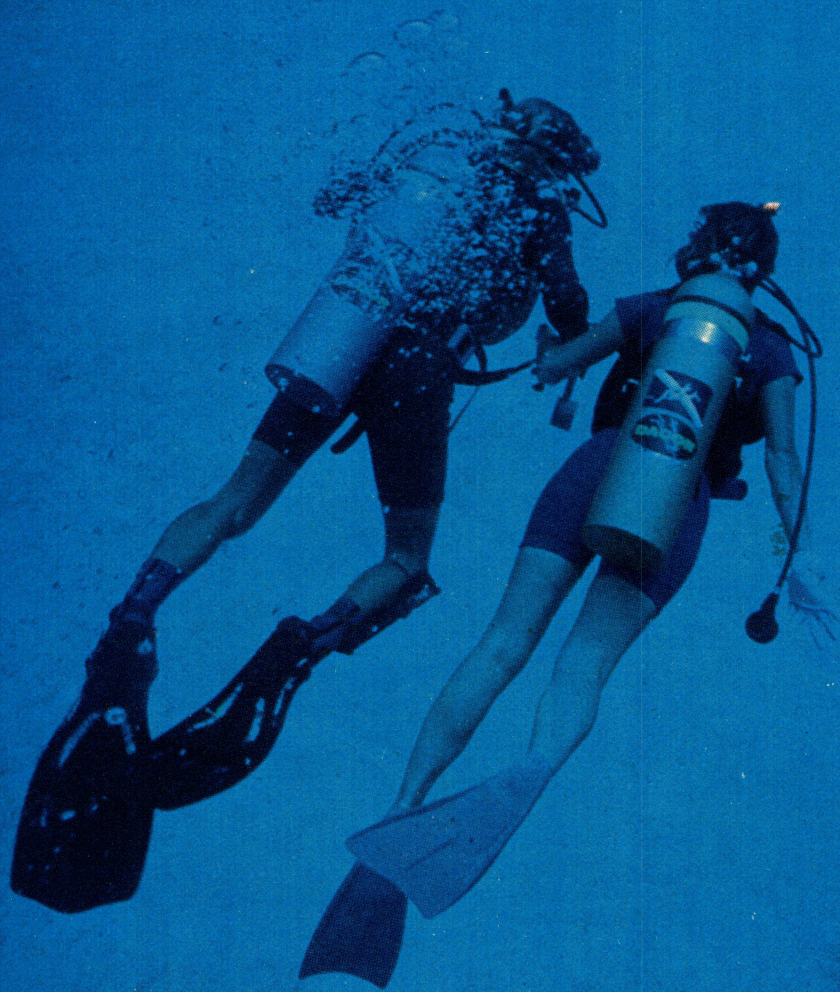
One of the latest discoveries for Pacific diving is the island of Guam, situated in the center of the western portion of Micronesia. Serving as the transportation and communications hub for the surrounding islands, Guam's busy airport is crisscrossed with daily flights from Saipan, Palau, Truk, Honolulu, and Tokyo. It is the jump-off point for travel to a variety of Micronesian island chains, including the Marianas, the Yap District, and the Palau islands.

Yet Guam is entirely different from its neighbors. It is not part of the Trust Territory of the Pacific (Micronesia), but instead a Territory of the United States. The 120,000 residents of this island are actually U.S. citizens, with a U.S. form of government and a banking and postal system identical to that here on the mainland. Guam is much like Hawaii was before it became one of the 50 states. It is also the western-most province of the U.S., located some 6400 miles from Los Angeles.

It is really a small island, measuring 32 miles in length and four to eight miles in width. Much of it is hilly, with the tallest peak rising some 1300 feet above sea level. There is approximately 55 miles of shoreline bordered by fringing coral reefs - an entirely different reef structure than the atolls and barrier reefs of Palau or Truk. Guam's coral slopes drop off into the deepest, bluest part of the Pacific, for the island is actually the very peak of the world's tallest mountain. Below the surface lies a massive submerged mountain whose base begins in the Marianas Trench, 36,198 feet deep. Much of the area around Guam is still unexplored and ocean scientists keep coming up with new and strange species of marine life.

The waters surrounding





Guam...

Guam are much warmer than Hawaii, for the island is only 800 miles from the equator. During 1968 and '69 the coral reefs were badly ravaged by the coral-killing crown of thorns starfish, but the reefs have since regenerated. In fact many of the reefs are better than before the starfish attack with greater variety of colorful corals. Scientists now suspect that the crown of thorns may be a natural cycle of events and nature's clever way of ridding the reefs of a dominant species of coral which may have monopolized the area.

There are approximately 40 excellent dive sites located around the island, most of which are beach dives or what the Guam divers call "walk-offs." The sites include a World War II Japanese Zero fighter which ran out of gas and crashed in 50 feet of water; a World War I German naval cruiser, a World War II Japanese freighter, and an American tanker. There is also a crystal clear blue hole, a large underwater cave occupied by a white-tipped shark, and a coral tunnel where the water temperature gets up past 90 degrees. Still not found, but known to exist somewhere on Guam's reefs are three Spanish galleons, a Japanese submarine, and a treasure laden vessel which could possibly have been a pirate ship.

Until recently, Guam had been overlooked by American divers traveling to Micronesia. Reports of the crown of thorns destruction, and the lack of organized dive tour facilities, made the island seem unappealing to traveling divers. Only the thousand or so resident divers (mostly military people) really knew how good the diving could be on this remote island.

All this has now changed. Hardly a trace remains of the coral damage five years ago. The island boasts three dive shops . . . Marianas Divers, Coral Reef Marine Center, and International Divers Association. All three offer scuba instruction, tank rentals, air refills, reef trips, and extended tours to Palau, Truk and Saipan. Guam has finally come of age as a Pacific island dive resort.

Last summer I had the pleasure of spending a week on Guam, diving with the staff from Coral Reef Marine Center, a surprisingly large and modern dive shop facility for the Pacific. In fact this shop is comparable to any of the leading California pro dive stores, and larger than any you would find in Hawaii or other parts of the Pacific. Located on the main road (Marine Drive), halfway between Apra Harbor and the Agana Boat Basin, this giant scuba center is housed in an ultramodern two-story building with an all-glass front. The main showroom is handsomely decorated with tanks and regulators of every brand, a complete underwater photo department, a complete library of instructional books on scuba and marine life identification, inflatable rubber boats, outboard motors, water skis, diver propulsion vehicles, swim suits, wet suits, and a dazzling array of scuba diving accessories.

Adjacent to the showroom is a classroom for basic scuba training and advanced courses as well. The instructors are both PADI and NAUI certified, and they

offer a variety of advance and specialty courses, including the NAUI sport diver course, a course in saltwater fish collecting and aquarium keeping, and various other advanced scuba classes. Behind the classroom is still another larger room for boat storage and outboard motor repair. In addition to its scuba facilities, the Marine Center is also an authorized dealer for Zodiac inflatable boats and Mercury engines. There is also a large lecture hall on the second floor above the showroom, where underwater movies and slides are shown regularly.

The most impressive department in the store is the air refill station. A giant 20 cfm/5000 psi Worthington compressor is utilized for filling 20 large 300 cubic foot high pressure storage cylinders. A total of 6000 cubic feet of high pressure air is stored for rapid refill of customer's tanks. In the rental department, a total of 100 scuba tanks, regulators, and back packs are kept on hand for outfitting large or numerous groups of visiting divers. The Marine Center also has three dive boats and motors on hand for short trips to the outer reefs around Guam. One craft is a 16 foot fiberglass hull, and the other two are Zodiac inflatables. The boat trips are generally kept to a maximum of four divers per boat, and a combination boat driver/underwater guide. The man directing this whole operation is Wayne Baumunk, general manager of Coral Reef Marine Center, Inc.

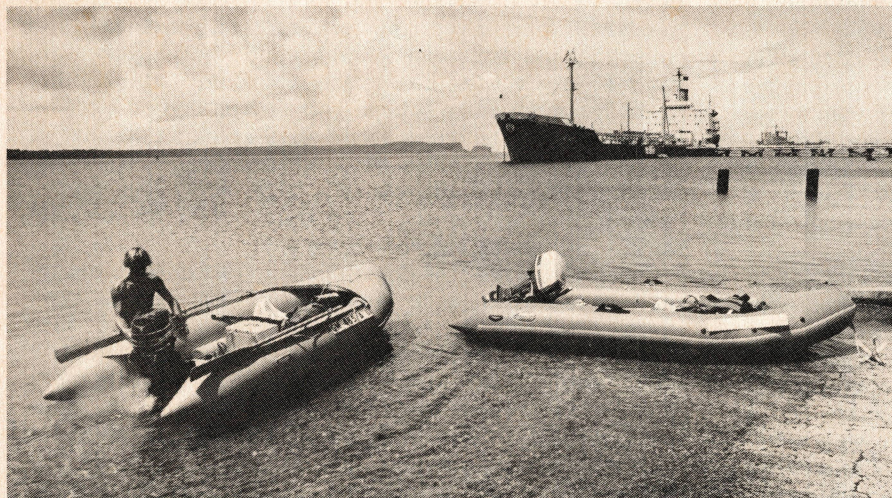
My dive guide for the week was a young gentleman by the name of Mitchell Warner, a certified NAUI instructor who teaches most of the advance diving classes at the Marine Center. Mitch turned out to be more fish than man . . . one of those rare breed who have chosen the sea for his career. It was quickly evident by the way he handled a boat and scuba gear that Mitch had spent the better part of his young life in the ocean. It was also no surprise to learn that he was a student at the University of Guam, completing his final phases of study for a degree in marine biology.

Mitch possessed an amazing storehouse of knowledge about the marine creatures which lived on the reefs, and his enthusiasm for natural history made him the ideal underwater guide. He would point out creatures hidden among the corals, and afterwards identify them by name and explain exactly what the creature was doing, what it hunted for food, and what, in turn, hunted it. A reef trip with Mitch was a fascinating educational experience, and one couldn't help but become totally turned on about the ocean environment. Like fine art or music, a coral reef community can be best enjoyed when one understands the marvelous intricacies of the subject.

As a student of marine biology, Mitch couldn't have picked a better spot to conduct his studies. The waters of Guam are rich with rare and exotic forms of Indo-Pacific marine life far different than the creatures found along the shores of America. Brightly colored lionfish, moorish idols, seahorses, butterflies, and gorgeous imperial angel-fish are just a few of the sparkling reef dwellers. Sea cucumbers grow to enormous lengths of three and four feet, and nudibranchs are decorated in outrageous color patterns. On one particular dive at Anae Island, we encountered a very rare silver and black lionfish, two octopuses, a deadly stonefish, and a large stinging anemone with three different clownfish living among its tentacles. The sea life around Guam is so prolific that one never tires of the sights — there is always another delightful discovery. For the underwater photography buff, Guam

Underwater guide Mitch Warner leads Doris Tzimoulis on a tour of the sand rivers at Double Reef. Guam has many marine oddities such as this giant sea cucumber found at Anae Island Reef, and the Bile Bay Reef's Spanish dancer.

Guam...



In recent years Guam has emerged as an exciting dive resort stopover enroute to Micronesia. Ultramodern scuba facilities and organized reef trips are attracting a growing number of Pacific travelers. Among the more unique dive spots around Guam are the fabulously clear Blue Hole, and the exciting Shark Grotto—a large underwater cave complete with its own resident white-tipped shark.



offers an endless source of close-up subjects which will dazzle and amaze his friends back on the mainland.

Prior to our tour of the island, Mitch explained that Guam's fringing coral reefs offer a tremendous variety of diving experiences. In some areas a broad shallow coral shelf extends outward from the beach 300 to 500 feet. In other areas, the reef drops straight away into great depth just 30 feet from shore. Whatever the visitor's preference, Guam is likely to have that kind of diving.

We started our tour at a place called Bile (pronounced Billy) Bay, a popular dive site for scuba instruction and weekend outings. This spot is described by Guam divers as a "coral walk-in." Starting from the beach, divers wade out in knee deep water for 200 feet, carefully treading over a coral shelf. The shelf then slopes gradually to a depth of 10 to 15 feet, and it is here that one begins to notice a great proliferation of small, colorful corals. The shelf then drops off abruptly from 20 feet to 55 feet where it meets a flat sandy plain. The reef is loaded with small tropical fish, bright blue and yellow Christmas tree worms, and hundreds of other fascinating creatures. For a quick, simple beach dive, you can't beat Bile Bay.

One of the most beautiful, but more remote, dive spots is Double Reef—located off an inaccessible part of the shoreline at the northwest end of the island. It can only be reached by a four-mile boat ride. Diving is done on the more protected inner reef, with depths ranging from 30 to 60 feet. The reef is made up of dozens of large, long coral ridges separated by wide sand rivers which wind their way among the coral canyons. Underwater visibility here is breathtaking and the reef is covered with living corals of every imaginable color and form. Schooling fish, friendly morays, and a few harmless reef white tips add to the excitement of this beautiful reef.

Two miles south of Double Reef is Shark Grotto, one of the most bizarre dives of Guam. The shoreline in this area is a 50 foot high limestone bluff, and carved into

this rocky coast is a large underwater cave. The entrance to the cave is located about a hundred feet from shore, in 40 feet of water. It's an impressive entrance measuring 30 feet high and 15 feet wide, and leading to an underwater room some 100 feet wide and perhaps just as long. A pile of huge boulders from the collapsed roof occupies the center of the cave. A shaft of sunlight streams in from the hole in the ceiling, dimly illuminating the shadowy corners and crevices of the cave. The grotto is filled with reef fishes of all types, but the main resident of the cave is a five foot white-tipped shark. He cruises the interior of the cave in a circular pattern, making a full orbit approximately every two minutes. It's quite an exhilarating experience, to say the least, to be exploring a dark underwater cave with a shark constantly circling around you. And yet the white-tip does not seem disturbed by the diver's presence, so long as he is not pressed or crowded into a corner.

For the wreck diving buff, Apra Harbor offers three large ships within close proximity of each other. A World War I German cruiser (the *S.M.S. Cormoran*) and a World War II Japanese freighter (*Tokai Maru*) lie side by side in 120 feet of water, marked by a large navigation buoy. Unfortunately the bottom is very silty and the water is murky in this part of the bay. Underwater visibility averages 5 to 15 feet, but souvenir hunting is still conducted by local divers. A mile further out in the harbor is the wreck, the water is much clearer and visibility averages 100 feet of water. Although there is little left aboard this wreck, the water is much clearer and visibility averages 50 feet or more. Soft corals are beginning to grow up the shallow side of this large oil tanker and schools of fish cruise about the hulk regularly.

The most spectacular dive to be found around Guam is a strange undersea phenomenon known as Blue Hole. Located off Orote Point and only accessible by boat, the entrance to this hole is found in 60 feet water on a narrow

coral shelf right under the towering limestone cliffs. The entrance is relatively small, measuring 10 by 20 feet. However, the shaft widens considerably as it drops vertically to a depth of 125 feet. The hole then makes a right angle turn and exits through the face of the vertical drop-off. By the time the hole exits into the open sea, it has reached gigantic proportions, with its lower reaches attaining a depth of 280 feet. The Blue Hole is a most impressive formation, appearing to many divers as some great under sea cathedral. Contributing to this awesome sight is the sparkling clarity of the water. Because it faces the open sea, and untouched by rain runoff, the drop-off at Blue Hole averages 200 feet-plus visibility. There is also a good deal of high voltage shark action along the face of the drop-off, where the hole empties into the deep ocean. Hammerheads and reef white-tips are the most commonly sighted sharks, but other ocean roaming species often pay a visit. Every diver who visits Blue Hole immediately becomes infatuated with it.

The diving possibilities around Guam go on into infinity. Although 40 locations have been found so far, and are dived regularly, another 50 spots are suspected to exist. In addition to those described so far, the following are regarded as among the top ten: Anae Island, Gun Beach, Zero Wreck, Piti Bomb Holes, Cabras Island, and Pago Bay. Guam's greatest single attraction seems to be the vast variety of diving offered.

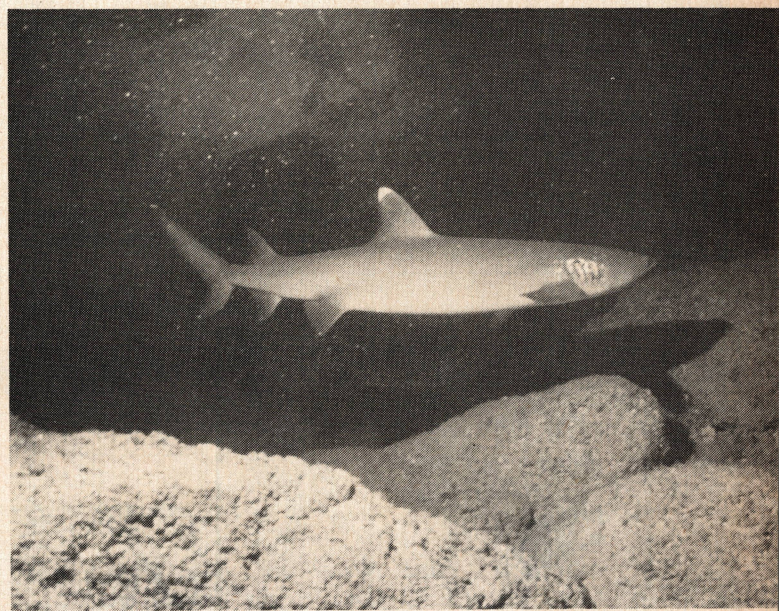
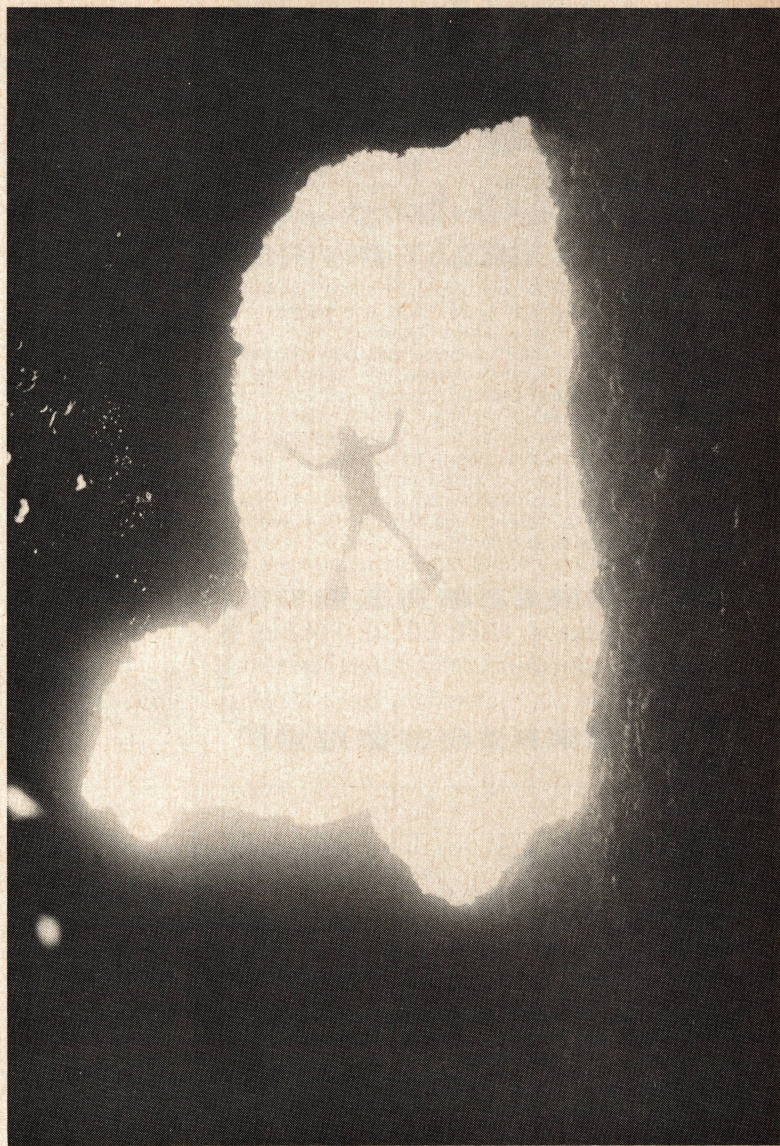
On a comparative basis, it would be fair to say that the quality of diving in Guam is not as good as Palau or Truk, but superior to Hawaii. It is equal to what one might find in Fiji, but with warmer waters and better scuba facilities. The most important point, however, is that Guam offers a different kind of diving than its Micronesian neighbors, and therefore should not be overlooked on a diving trip into the far Pacific.

As for topside facilities, Guam offers some of the finest hotel accommodations and restaurants in the western Pacific. The most popular hotel among divers is the Guam Continental, located right on the beach at Tumon Bay. Designed in a bungalow style arrangement, the Guam Continental covers 25 acres of lush tropical gardens, and offers the maximum in personal privacy. Nearby is the luxurious Guam Hilton with its sumptuous Galleon Grill restaurant for gourmet dining.

If you desire something a little more economical, try the Cliff Hotel, overlooking downtown Agana. There are also several low priced restaurants around the island, which offer good food with an informal atmosphere. The House of Chin Fee serves one of the best Chinese meals in town. For Mexican dishes, try Joe & Flo's, and for Italian food, Roco's is great. If you're really hungry after a hard day of diving, Kenny's is a super spot for a giant size platter of steak and shrimp. No one ever leaves this place wanting more.

Since Guam is right in line with the rest of the Micronesian island chain, the obvious mode of transportation is Air Micronesia. From the Guam air terminal, you can take an Air Mike jet to Saipan to the north; Palau and Yap to the south; Truk, Ponape, Majuro, or Honolulu to the east; or Okinawa to the west. A stopover in Guam can be booked at no extra charge as part of a regular Micronesian islands tour.

For more information about diving activities and equipment rentals cost in Guam, you can write to: Wayne Baumunk, Coral Reef Marine Center, P.O. Box 2792, Agana, Guam 96910. >





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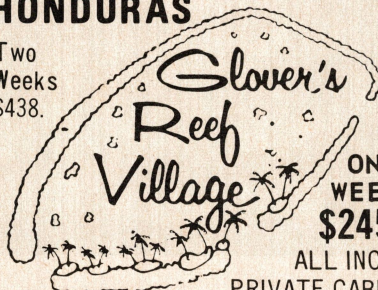
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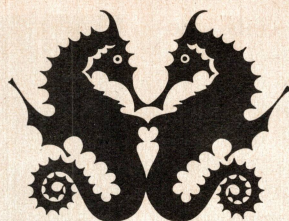
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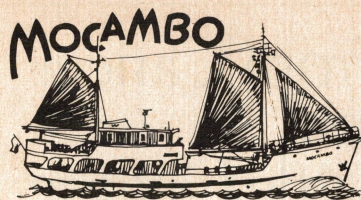
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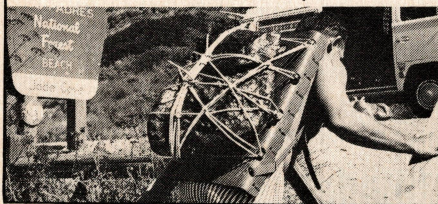


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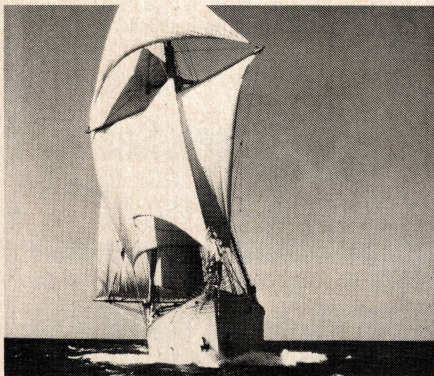
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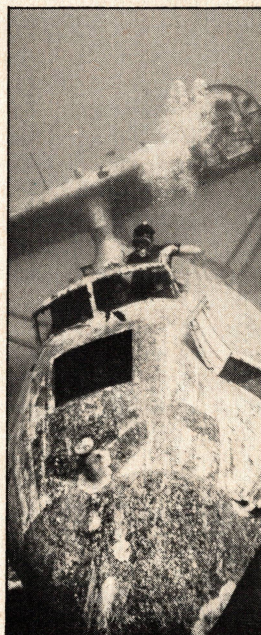


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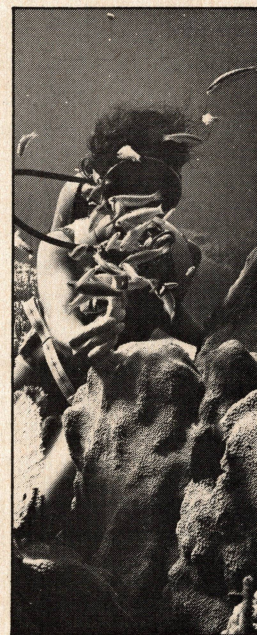


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Metal shipwrecks of the early twentieth century, sitting in 50 to 60 feet of clear water, round out this interesting and unique diving area. The *Evelyn*, for instance, is a salt carrying freighter which sank in 1924. The engine, shaft, spare propeller and two boilers are large, impressive landmarks in an area of wreckage covering hundreds of square feet. In the initial search for this wreck last summer, three cannon and a large quantity of grape shot was located in close proximity to the *Evelyn* — undoubtedly the remains of an unfortunate man-of-war attempting to enter the nearby harbor.



The Louisbourg Harbour was closed to all sport diving in 1961, because the government was afraid of losing historic U/W artifacts. The area was opened last summer by the National Department of Indian Affairs and Northern Development, however, and Dive Cape Breton Ltd. was granted the right to conduct supervised dive tours in and around the historic location. The experience of the season, during which many divers from Canada and the United States were guided over the wreck sites, showed that preservation steps are being respected.

For information on charter rates, accommodations and other points of interest in the area, contact: Dive Cape Breton Ltd., 90 Warren Ave., Louisbourg, Nova Scotia, Canada.

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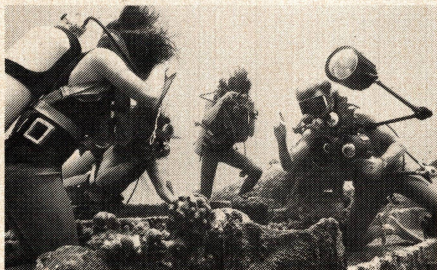
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CAYMAN PHOTO COURSES

Jim and Cathy Church, authors of the "Underwater Photography Quick and Easy" series featured in SDM, and the book *Beginning Underwater Photography*, will be teaching underwater photography at Grand Cayman, British West Indies, again this summer. The Churches will be joined by Nancy Sefton, co-owner of Spanish Bay Reef Resort, whose knowledge of local reef life will add a new dimension to the course. The package price for the six-day courses, which begin July 20 and August 3, 1974, at Spanish Bay Reef Resort, is \$325 per person. This covers tuition, diving expenses and complete accommodations.



Tuition includes lectures and demonstrations, on-the-spot processing of both color slide and black and white film, use of strobe equipment for assignments, use of close-up lenses and extension tubes, a copy of the text and evening slide shows. Diving includes tanks, air, weight belts and daily excursions from shore or one of the resort's boats. Accommodations include room, three meals daily and all scheduled ground transportation.

Students may stay an additional four days after the basic six-day course for additional instruction and field work for \$49 per day, and may stay longer than ten days for an additional \$39 per day without instruction. Non-divers accompanying students will be accommodated at the regular non-diver resort rates. For more information, write to: Jim and Cathy Church, Box 80, Gilroy, California 95020.

NAUI STARTS NEW COURSES

This spring the National Association of Underwater Instructors is introducing a series of weekend instructor qualification courses to precede their newly developed instructor training courses. This combination will replace the instructor certification course as a method of certifying qualified candidates as NAUI instructors.

For more information and a list of these new courses contact NAUI Headquarters, 22809 Barton Rd., Grand Terrace (Colton), Calif. 92324.

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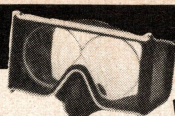
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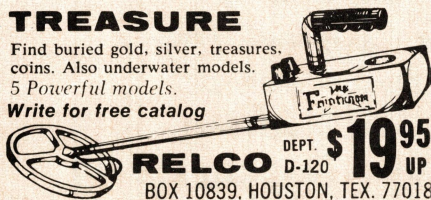
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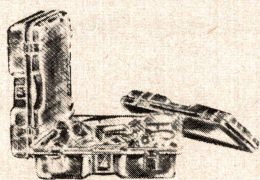
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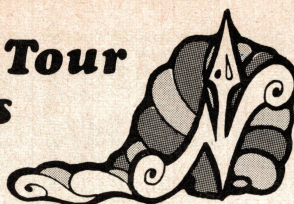
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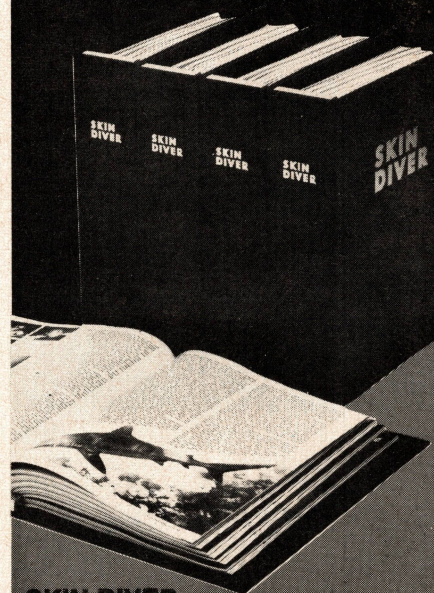
Dive Tour News



(Continued from Page 72)

- June 7—BONAIRE/CURACAO—9 days, Loyal Travel, Inc., San Antonio, Texas.
- June 8—SPANISH HONDURAS—6 days, Grand Am Int'l Tours, Ocala, Fla.
- June 8—BIMINI—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- June 10—HAWAII/KONA—8 days, See & Sea Travel, San Francisco, Calif.
- June 11—HAWAII/KONA—8 days, Photomarine Int'l Travel, Reseda, Calif.
- June 11 & 25—TRUK/PONAPE—11 days, Inner-space Adventures, Hickam, Hawaii.
- June 13—VIRGIN ISLANDS—12 days, Sierra Club, San Francisco, Calif., Trip #382.
- June 14—RIO DE JANEIRO, BRAZIL—14 days, Sunland Int'l Tours, Beverly Hills, Calif.
- June 14—COZUMEL/YUCATAN — 7-12 days, See & Sea, San Francisco, California.
- June 15—CAYMAN BRAC—8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- June 15—BRITISH HONDURAS—8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- June 15 — TRUK/PALAU — 15 days, Atlantis Safaris, Miami Shores, Fla.
- June 16—AKUMAL—7 days, Underwater Explorers Society, Pompano Beach, Florida.
- June 16—COZUMEL—7 days, Chalet Club, New York, New York
- June 17 — AKUMAL — 10 days, Photomarine Int'l Travel, Reseda, Calif.
- June 17—SEA OF CORTEZ—11 days, Sierra Club, San Francisco, Calif., Trip #337.
- June 19—BIMINI—10 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- June 22—CAYMAN ISLANDS — 8 days, Dewey Bergman, See & Sea, San Francisco, Ca.
- June 22—CAYMAN BRAC—8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- June 22—BONAIRE/CURACAO—9 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- June 22 — COZUMEL — 7 days, Skin Diving School, Bronx, N.Y.
- June 23 — COZUMEL — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- June 24—GRAND CAYMAN—10 days, Sierra Club Outings, San Francisco, Calif.
- June 24—PANAMA/SAN BLAS—10 days, Photomarine Int'l Travel, Reseda, Calif.
- June 26—GALAPAGOS ISLANDS — 18 days, Dewey Bergman, See & Sea, San Francisco, Ca.
- June 28 — COZUMEL/AKUMAL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- June 29—GRENADINES—7 days, Windward Lee-ward Sailing Tours, San Francisco, Calif.
- July 3 & 15—NASSAU—7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- July 4—MAUI & LANAI, HAWAII—11 days, Sierra Club, San Francisco, Calif., Trip #312.
- July 5, 12, 19, 26—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
- July 6—GRAND CAYMAN—11 days, Sierra Club Outings, San Francisco, Calif.
- July 6—BONAIRE/CURACAO—9 days, John Kelley, See & Sea Travel, San Francisco, Calif.
- July 6—BONAIRE/CURACAO—9 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- July 6—NOVA SCOTIA—7 days, Chalet Club, New York, New York
- July 6—GRENADINES—7 days, Windward Lee-ward Sailing Tours, San Francisco, Calif.
- July 7—ROATAN/HONDURAS—7 days, Kathy Taylor, Island Reef Safaris, Wilton, Conn.
- July 12—SPANISH HONDURAS—4 days, Grand Am Int'l Tours, Ocala, Fla.
- July 13—ANDROS, BAHAMAS—7 days, Underwater Safaris, Boston, Mass.
- July 13—COZUMEL/YUCATAN—8 days, Anchor Shack, See & Sea Travel, San Francisco.

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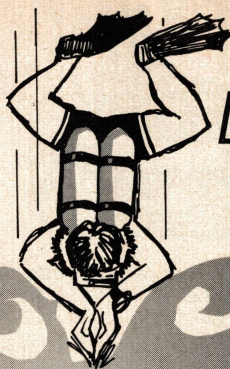
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July 14—ROATAN/HONDURAS—7 days, Kathy Taylor, Island Reef Safaris, Wilton, Conn.
 July 14—CAYMAN BRAC—7 days, U/W Explorers Society, Pompano Beach, Florida.
 July 16—GALAPAGOS—23 days, Sierra Club, San Francisco, Calif. Trip #340.
 July 18—MAUI & LANAI, HAWAII—11 days, Sierra Club, San Francisco, Calif., Trip #313.
 July 20—CAYMAN ISLANDS—8 days, Bernie Campoli, See & Sea Travel, San Francisco.
 July 20—BRITISH HONDURAS—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
 July 21—COZUMEL—7 days, Go Mexico, Inc., Minneapolis, Minn.
 July 23—TRUK/PONAPE—11 days, Innerspace Adventures, Hickam, Hawaii.
 July 27—GRENADINES—7 days, Windward Leeward Sailing Tours, San Francisco, Calif.
 July 28—TAHITI/RANGIROA—9 days, Photomarine Int'l Travel, Reseda, Calif.
 Aug. 2—BIMINI—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Aug. 2, 30—COZUMEL/AKUMAL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
 Aug. 2, 9, 16, 23, 30—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
 Aug. 3—GRENADINES—7 days, Windward Leeward Sailing Tours, San Francisco, Calif.
 Aug. 10—SPANISH HONDURAS—6 days, Grand Am Int'l Tours, Ocala, Fla.
 Aug. 12—BIMINI—10 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Aug. 17—CAYMAN ISLANDS—8 days, John Reseck, See & Sea Travel, San Francisco, Calif.
 Aug. 17—BONAIRE/CURACAO—9 days, Peter Capen, See & Sea Travel, San Francisco, Calif.
 Aug. 18—AKUMAL—7 days, U/W Explorers Society, Pompano Beach, Florida.
 Aug. 19—AMERICAN & WEST SAMOA—15 days, Sierra Club, San Francisco, Calif., Trip #356.
 Aug. 19—PANAMA/SAN BLAS—10 days, Photomarine Int'l Travel, Reseda, Calif.
 Aug. 20—TRUK/PONAPE—11 days, Innerspace Adventures, Hickam, Hawaii.
 Aug. 24—COZUMEL/YUCATAN—8 days, Gene Foster, See & Sea Travel, San Francisco, Calif.
 Aug. 24—GRENADINES—7 days, Windward Leeward Sailing Tours, San Francisco, Calif.
 Aug. 26—NASSAU—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Aug. 30—COZUMEL/CHINCHORRO REEF—11 days, Sunland Int'l Tours, Beverly Hills, Calif.
 Aug. 30—PUERTO RICO—4 days, Chalet Club, New York, New York
 Aug. 31—GRENADINES—7 days, Windward Leeward Sailing Tours, San Francisco, Calif.
 Sept. 2—MARISLA/SEA OF CORTEZ—7 days, Photomarine Int'l Travel, Reseda, Calif.
 Sept. 6—NASSAU—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Sept. 6, 13, 20, 27—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
 Sept. 6—GREEK ISLANDS—17 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
 Sept. 7—CAYMAN ISLANDS—13 days, Dewey Bergman, See & Sea Travel, San Francisco.
 Sept. 7—BONAIRE/CURACAO—9 days, Carl Roessler, See & Sea Travel, San Francisco.
 Sept. 9—HAWAII/KONA—8 days, See & Sea Travel, San Francisco, Calif.
 Sept. 13—RIO DE JANEIRO, BRAZIL—14 days, Sunland Int'l Tours, Beverly Hills, Calif.
 Sept. 13—SPANISH HONDURAS—4 days, Grand Am Int'l Tours, Ocala, Fla.
 Sept. 27—BIMINI—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Oct. 4—MARISLA/SEA OF CORTEZ—7 days, Photomarine Int'l Travel, Reseda, Calif.
 Oct. 4, 11, 18, 25—BONAIRE—8 days, Royal Caribbean Services, New York, N.Y.
 Oct. 5—GRENADINES—7 days, Windward Leeward Sailing Tours, San Francisco, Calif.
 Oct. 7—BIMINI—7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
 Oct. 11—COZUMEL/AKUMAL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
 Oct. 12—SPANISH HONDURAS—6 days, Grand Am Int'l Tours, Ocala, Fla.



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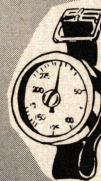
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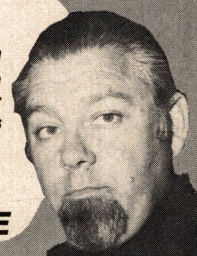
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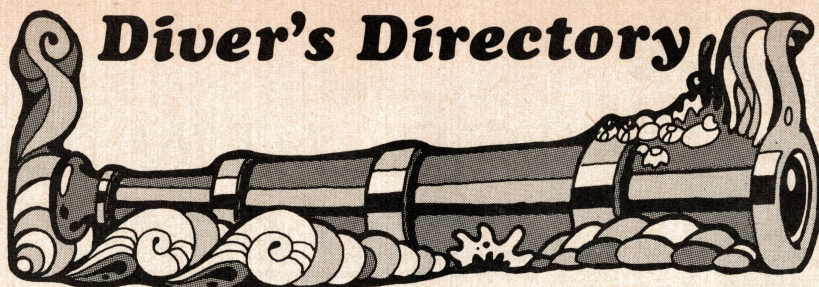


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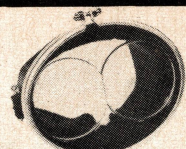
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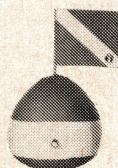
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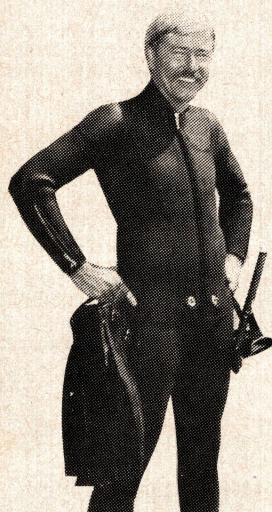
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Tell the world you're a diver. Wear a diver's cap. Knit cap in either red or blue color.



WIDE-VISION DIVE MASK \$5.95
Provides wide vision without a heavy feel. Has finger wells for easy equalization, feather edge and double seal for water-tight fit, extra large purge valve. Tempered lense.



BUOYANCY COMPENSATOR \$29.95
This famous make vest features a corrugated, large diameter oral inflator, over-pressure relief valve, handy accessory pocket, and removable nylon harness with crotch strap. Choice of high visibility yellow or professional black color.



CONTOUR BACK PACK \$11.95
Features break resistant material for unequaled durability, stainless steel band, simple wing nut adjustment, and fits all standard 6.9" diameter cylinders.



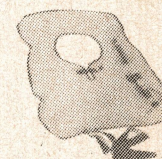
TANK PRESSURE GAUGE \$12.50
Self bleeding with neoprene shockproof cover. Fits all standard tanks. Easy to read dial and compact design.



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Unique sleeve mounts any type of watch, compass, depth gauge, temperature gauge, or other instruments in an easy to read, stationary position. Sizes S, M, L, XL.



INFLATABLE VEST \$19.95
Well designed and inexpensive, this vest features a snap front for easy entry, oral inflator, cartridge inflator that accepts screw thread 16 gram cylinders, heavy duty material, and orange color for good visibility.



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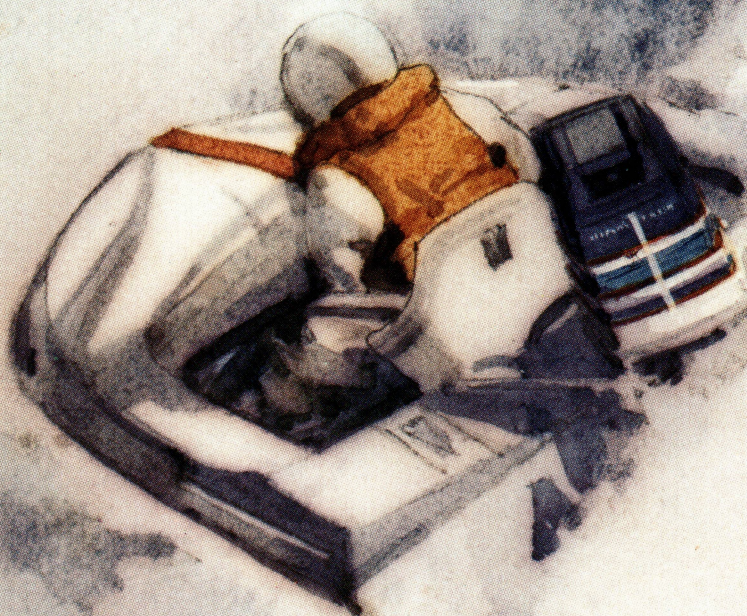
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